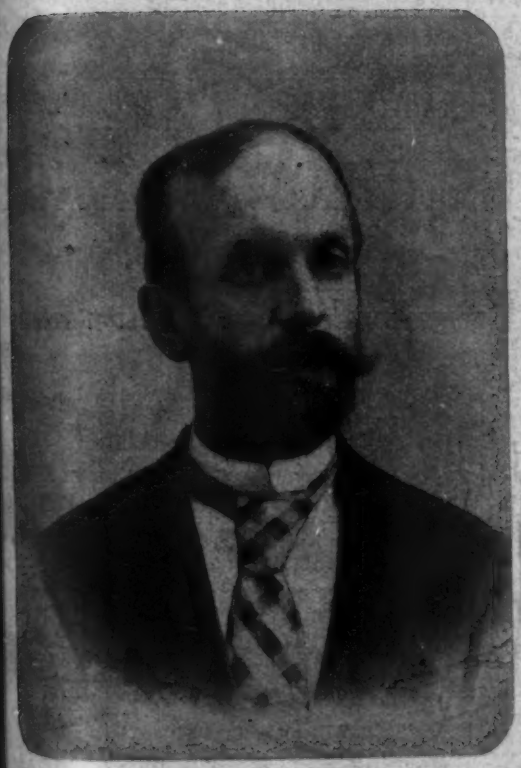
NION OF PRACTICAL TEACHERS AT SWANSEA.

(See page 659.)

P.P. 1181. f

THE

PRACTICAL TEACHER



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BELGIAN REPRESENTATIVE AT THE SWANSEA CONFERENCE.

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·VOL· XVII
Nº 11

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A MONTHLY EDUCATIONAL JOURNAL.

'Knowledge is proud that he has learned so much,
Wisdom is humble that he knows no more.'—COWPER.

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EDUCATION IN FRANCE.

I.—A FRENCH TRAINING COLLEGE—L'ECOLE NORMALE DE DRAGUIGNAN.

BY T. MIEILLE.

[THE Département du Var counts 350 elementary schools, with a staff of 500 teachers, for a population of about 300,000 inhabitants. Those numbers include girls as well as boys, and teachers of both sexes. As the readers of the PRACTICAL TEACHER must know, the organisation of elementary schools is the same all over France, and one *département* can be taken as a fair sample of all the 85 others.

The laws of the 14th June 1854, and 30th October 1886, have organised primary education in France as a State institution, with a saving clause permitting, under certain regulations and restrictions, the existence of private elementary schools, subject to the authority and supervision of the Government Inspectors. The Département du Var possesses above a hundred of those private schools, some very flourishing, and nearly all belonging to religious orders.]

The *Ecoles Normales Primaires* (Training Colleges) are public schools whose scope is to supply elementary masters or mistresses to the national schools. They are placed under the supervision of the Rector (the head of the Academy), and subject to the direct authority of the Minister of Education, who appoints the masters and the mistresses.

The course of studies lasts three years, and only boarders are received. Since the law of October 30th, 1886, the board is entirely free, nothing being required from the pupils but an engagement to serve ten years as elementary masters.

As a rule, every one of the 86 French *départements* must have two Training Colleges, one for boy and one for girl pupils; but the poorer *départements* are authorised to club together, so to speak, and a few have only one normal school, exchanging their girl-pupils with the boy-pupils of the neighbouring *département*.

An elementary school is annexed to every training college, in which, under the direction of a qualified teacher belonging to the staff of the college, the pupils are exercised in the practice of teaching, and take in turns the different sections or divisions, acting sometimes as masters, sometimes as monitors, a certain amount of time being allowed them for the preparation of lessons. They have to draw up a report which is submitted to the headmaster, and forms every week the subject of a *Conférence Pédagogique* before the assembled school.

The number of pupils is not fixed, but varies every year according to the wants of the *département* in masters or mistresses.

The entrance examination to the Training College takes place every year in the last week of July. The number of places being limited, the examination is conducted under the competition system, and there are very often as many as five or even ten times more candidates than available places. The candidates must be over sixteen years of age, and must produce the following documents:—

1. Certificate of birth.
2. Certificate of capacity.
3. An engagement to serve ten years.

The candidates must have passed with success the *Brevet de Capacité* (a kind of lower grade Teacher's Certificate), and the examination bears on the subjects taught in elementary schools, but in such a way as to test the teaching capabilities of the candidate.

THE TRAINING COLLEGE TIME TABLE.

ACADÉMIE D'AIX. — TABLEAU HORAIRE DE L'EMPLOI DU TEMPS À L'ECOLE NORMALE D'INSTITUTEURS DE DRAGUIGNAN. (ANNÉE 1896-97). — DÉPARTEMENT DU VAR.

Jours.	Années.	5 heures à 5½.	5½ à 7.	7 à 8.	8 à 9.	9 à 10.	10 à 10½.	10½ à 11.	11 à midi.	Midi à 1 heure.	1 à 2.	2 à 3.	3 à 4.	4 à 5.	5 à 6.	6 à 7.	7 à 8.	8 à 8½.
Lundi.	1e 2e 3e	Lever—Toilette.	Etude.	Service de propreté—Déjeuner—Récréation.	Géométrie. Lecture. Physique.	Ecriture. Physique. Arithmétique.	Récréation.	Dessin Géométrique. id. Histoire.		Repas—Récréation.	Chant choral.	Lecture. Gymnastique. Dessin Géométrique.	Gymnastique. Grammaire.	Goûter—Récréation et trav. agricoles	Etude. Etude. Anglais.	Italien. Etude.	Etude.	Repas—Récréation—Coucher.
Mardi.	1e 2e 3e				Psychologie id. Composition française.	Histoire. Géométrie.		Travail manuel. Etude. | Géographie. Travail manuel.			Musique. id. Etude.	Etude. Etude. Musique.	Algèbre. Hre naturelle.		Etude.			
Mercredi.	1e 2e 3e				Arithmétique. Composition française. Pédagogie.	Chimie. Géométrie.		Grammaire. Travail manuel. Etude.	Etude. Chimie.		Gymnastique.	Géographie. Etude. Physique.	Etude. Histoire. Lecture.					
Jeudi.	1e 2e 3e				Histoire. Dessin d'imitation id.	Italien.		Psychologie. id. Anglais.	Etude. Italien. Hre littéraire.		Hiver: Promenade les 1e et 3e jeudis du mois. Sortie les 2e et 4e jeudis. Eté: Etude, réservée à la lecture des auteurs classiques.			1e année : Mercredi. 2e année : Lundi. 3e année : Vendredi.	Hiver: Etude, réservée à la lecture des auteurs classiques. Eté: Sortie les 2e et 4e jeudis du mois. Promenade les autres jeudis.			
Vendredi.	1e 2e 3e				Hre naturelle. Arithmétique. Etude.	Lecture. Histoire. Algèbre.		Composition française. Etude. | Chimie. Histoire.			Musique. id. Etude.	Dessin d'imitation Agriculture. id.			Etude.			
Samedi.	1e 2e 3e				Histoire. Hre naturelle. Géométrie.	Etude. Géométrie. Géographie.		Arithmétique. Italien. Etude.	Gymnastique. Etude. Gymnastique.		Ecriture. id. Etude.	Physique. Histoire. Pédagogie.	Conférence.		Composition sur l'une des matières du programme, sous la surveillance du professeur qui enseigne cette matière.			
Dimanche.	1e 2e 3e				Compte-rendu des notes par le Directeur. Lecture par le Directeur ou par un élève.	Sortie pour le Culte.	Etude, réservée à la lecture des auteurs inscrits au programme du brevet supérieur.				Sortie: Jusqu'à 5 heures : du 1e octobre au 31 mars—Etude : de 5½ heures à 8 heures. Jusqu'à 6 heures : du 1e avril au 31 mai—Etude : de 6 heures à 8 heures. De 4 à 7½ heures : du 1e juin à la sortie—Etude : de 1 heure à 3½ heures.						

TIME TABLE—ELEMENTARY SCHOOLS.

DÉPARTEMENT DU VAR. Arrondissement de ____ — ACADÉMIE D'AIX. — TABLEAU DE L'EMPLOI DU TEMPS. — Commune de ____ ÉCOLE DE ____

7h. 33	8h.	8h. 30	8h. 50	9h. 05	9h. 30	9h. 45	10h. 10	10h. 30	11h.
d	8								

DÉPARTEMENT DU VAR. — Arrondissement de _____

TIME TABLE—ELEMENTARY SCHOOLS.

ACADÉMIE D'AIX.

TABLEAU DE L'EMPLOI DU TEMPS.

Commune de _____ ÉCOLE DE _____

MATIN.

	7h. 33 8h.	8h. 30	8h. 50	9h. 05	9h. 30 9h. 45	10h. 10	10h. 30	11h.
Section enfantine | Cours élémentaire | Cours moyen & sup.		30m.		35m.	25m.	15m.	25m.	20m.	30m.
		Lundi - Mercredi - Samedi - } Morale (1)		*Devoir d'application :* Arithmétique, Geémetrie, Systéme métrique.	Lundi - Mercredi - Samedi - } Arithmétique; Mardi - Géométrie; Vendredi - Syst. métrique		Lundi - Mercredi - Samedi - } Lecture (4)	Exercice écrit sur la Lecture ou la Récitation	Lundi - Mercredi - Samedi - } Ecriture
Mise en rang. Inspection de propreté. Entrée avec chant.		Mardi - Vendredi - } Instruction civique		20m. Lundi - Mercredi - Samedi - } Arithmétique; Mardi - Géométrie; Vendredi - Syst. métrique	*Devoir d'application :* Arithmétique, Géométrie, Systéme métrique.	Appel.—Récréation.	Mardi - Vendredi - Récitation.		Mardi - Vendredi - Dessin
				20m. Lecture (2) (*Moniteur*)	Calcul (3) (*Maître*) — Petit devoir de calcul sur cahier ou ardoise (*Moniteur*)		Récitation (*Moniteur*)	Lecture (*Maître*)	

SOIR.

	12h55 1h.	1h. 15	1h. 30	1h. 50	2h. 10	2h. 35	2h. 50	3h. 20	3h. 40	4h.
Section enfantine | Cours élémentaire | Cours moyen & sup.		Lundi - Mardi - Vendredi } Préparation des leçons } Grammaire et préparation de la dictée } Dictée(5) } Exercice			25m. Lundi Mercr. Samedi } Sciences; Garcons: Mardi Vendr. } Agriculture; Filles: Mardi Vendr. } Economie domestique (7)	15m.	30m. Lundi - Mercredi Samedi - } Histoire; Mardi - Vendredi - Géographie	*Devoir d'application :* 20m. Lundi Histoire; Mercredi Cartographie; Vendredi Garç. Science / Filles. Travaux manuels; Mardi Garç. Agriculture / Filles. Travaux manuels; Samedi Lecture par le Maître.	20m. Correction; Chant; Correction; Travaux manuels; Gymnastique (8).
Mise en rang. Inspection de propreté. Entrée avec chant.		Mercredi Samedi } Composition française et compte-rendu de la précédente. 70m.				Appel.—Récréation.				
		Lundi - Mardi - Vendredi } Grammaire et préparation de la dictée (*Maître*) } Dictée (*Moniteur*) } Exercice		20m. Lundi Mardi Vendr. } leçons de choses; Mercr. Samedi } Langue française (6) *Maître*	30m. Petit devoir écrit sur la leçon précédente (6) (*Moniteur*)		25m. Calcul (3) (*Moniteur*)	20m. Lundi - Mercredi Vendredi } Histoire; Mardi - Géographie (*Maître*); Samedi Comme les 2 cours.	20m. Lundi Vendr. } Récitation ou écriture (*Moniteur*). Mardi Mercr. Samedi } Comme les 2 autres cours.
		Mercredi Samedi } Comme les deux premiers cours. 50m.								
		30m. Lecture (2) (*Moniteur*)		20m. Ecriture (*Moniteur*)						

Cet emploi du temps convient, avec de legères modifications, aux ecoles à plusieurs classes. Il suffit de combiner les exercices non communs de manière à donner une leçon à une division pendant que l'autre fait un devoir ecrit et *vice versa*.

OBSERVATIONS.—Avant de confier une section à un moniteur, le maitre met en sa présence, l'exercice en train pendant 2 ou 3 minutes : le moniteur sens directions est le pire des maitres ; dirigé, il est très utile.

1. Une fois par quinzaine, le samedi, la leçon de morale sera remplacée par une leçon de "tenue ou politesse."
2. Les élèves qui ne sont pas à la lecture courante, réunis en un seul groupe, devront le tableau noir pour la méthode de lecture-écriture-orthographe.
3. Application de la méthode de calcul concret-écrit abstrait à l'aide de bûchettes ou autres objets separés.
4. Lorsque cet exercice n'est pas commun aux deux cours, le maitre peut se contenter de faire lire la moitié des eleves de chaque cours.
5. Les exercices de langue française leçons et devoirs) peuvent être souvent communs aux deux cours élementaire et moyen.
6. Petites phrases sur les mots tires de la leçon de lecture ; ou petite dictee très facile, ou petites exercices de conjugaison orale, ou premières notions de grammaire, ou petite causerie. Le devoir suivant n'est que la copie sur ardoise ou cahier de la partie de l'exercice qui a ete ecrit sur le tableau. Il en est de même des leçons de choses dont un tres court resume, ecrit à mesure sur le tableau noir est reproduit en devoir.
7. Dans les ecoles mixtes, une leçon d'economie domestique par quinzaine seulement.
8. Pendant la lecture du samedi soir par le maitre les filles peuvent se livrer à des travaux manuels libres et les continuer pendant la gymnastique dans les ecoles mixtes.

The following is the list of subjects taught, and their distribution :—

I.—*Boys' Training College.*

Subjects.	Total of hours per week. 1st Year.	2nd Year.	3rd Year.
Civic Instruction	—	—	1
Moral Instruction	2	2	—
Pedagogy and School Organisation	1	1	1
French Language and Literature	7	5	4
History	4	3	3
Geography	1	1	1
Arithmetic and Book-keeping	2	3	3
Geometry and Mensuration	1	2	3
Physics	1	2	2
Chemistry	1	1	1
Natural Sciences	1	1	2
Agriculture and Horticulture	—	1	1
Modern Languages	2	2	2
Drawing	4	4	4
Singing and Music	2	2	2
Gymnastics and Military Drill	3	3	3
Handwork and Farmwork	4	4	4
Total	38	38	37

II.—*Girls' Training Colleges.*

Subjects.	Total of hours per week. 1st Year.	2nd Year.	3rd Year.
Moral and Civic Instruction	1	1	1
School Organisation and Pedagogy.	1	1	1
French Language and Literature.	6	5	4
History	4	3	3
Geography	1	1	1
Arithmetic and Book-keeping.	3	3	3
Physics	—	1	1
Chemistry	—	1	1
Natural Science	1	2	2
Domestic Economy and Hygiene.	—	1	1
Modern Languages	2	2	2
Writing—Penmanship	3	1	—
Needlework	3	3	3
Drawing	4	4	4
Music and Singing	2	2	2
Gymnastics	2	2	2
Gardening	2	2	2
Total	35	35	33

In the Girls' Training Colleges, the Head Mistress and the *Economé* (Bursar) must devote a certain time (outside school hours) to initiating the pupils into what one of our poets calls 'the beneficent mysteries of housewifery' (*les soins du ménage*).

Teaching Staff.

The teaching *personnel* of the *Ecole Normale* is composed as follows :—

Director.—The Headmaster or Director is generally an ex-Normal School teacher who has qualified for the headmastership by passing the competitive examination called *Certificat d'Aptitude à l'Inspection des Ecoles Primaires et à la Direction des Ecoles Normales.* So that the same examination entitles the successful candidate to the post of an Inspector of Primary Schools or to the headmastership of a Training College. But, as a rule, one begins with the inspectorship, the directorship of a Training College being reserved to the ablest Inspectors.

The salary of the Director ranges from £150 to £225, plus, of course, the advantages derived from his situation as enjoying state furnished apartments, a garden, etc.

The average age at which that situation is reached is from 40 to 45, the pension age being 60.

Teachers as Professors.—The majority of Normal School teachers come from the Ecole Normale Supérieure de St. Cloud for men, and Fontenay-aux-Roses for ladies. The others are able and hard-working elementary masters who have plodded on their way to the higher certificate, and they may be said to be the *élite* of the profession.

The higher certificate is called *Le Professorat ou Certificat d'Aptitude au Professorat des Ecoles Normales.* The *Brevet Supérieur* (the leaving certificate of the Training Colleges) and the *Certificat d'Aptitude Pédagogique* are required from the candidates to the *Professorat.* The subjects taught in St. Cloud and Fontenay are the same as form the programme or curriculum of the Training Colleges, but, of course, taken in a broader point of view, and adapted to the views and requirements of the future Professor.

This certificate or *Professorat* is double, that is to say, forms two separate divisions, viz. :—(1) *Professorat Sciences;* (2) *Professorat Lettres;* the division of work being a recognised principle of our system of teaching certificates. (It is as well to remark here that the *Brevet Supérieur* does not separate Sciences from Letters, so that a *Professeur de Sciences* has a *teinture de Lettres*, and reciprocally.

All Training Colleges have a fixed staff of teachers, thus:—

(1) 2 Professors of Letters.
(2) 2 Professors of Sciences.
(3) Auxiliary Teachers: Modern Languages, Music, Drawing, Gymnastics, etc.

These auxiliary teachers are often borrowed from the *Enseignement Secondaire* (witness myself, who am Professor of English to the *Lycée* here).

A Bursar or *Economé* has charge of the material management of the school, and is placed under the immediate authority of the headmaster. The *Economé* is generally a Professor, and receives an additional salary.

The salaries of the teachers are rather parsimoniously meted out to them. They range from £100 (2,500 frs.) to £150, which limit they are all bound to reach by successive rises every four or five years.

As was said before, the Director of the Primary School annexed to the Training College for the pupils' practice, is also a Professor and must be counted as one of the staff.

Hours of Service per Week.

While the headmaster, together with the general management of the school, takes upon himself the Moral and Pedagogy lessons, the teachers must give a certain number of hours per week, fixed in this way :—

Professors of Sciences	14 hours
Professors of Letters	16 hours
Director of the *Ecole Annexe*	30 hours
Bursar—Economé	10 hours

The auxiliary masters are paid by the hour, thus :—

Modern languages	150 frs. an hour for the year
Other masters	100 frs. ,, ,,

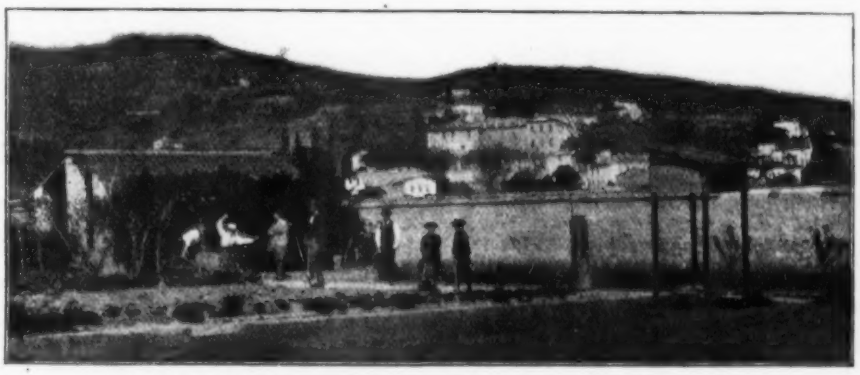
What has been said about the Boys' Training Colleges must be taken for granted of the Girls', with the following differences :—

(1) While the professors in the former are not resident, those in the latter are obliged to be so (unless married), and their salary is diminished by the amount charged for board and lodging.

(2) The salaries of the mistresses are a little lower than the masters; an injustice which has not been committed in Secondary Teaching (*Lycées et Collèges de Jeunes Filles*), and which, we earnestly hope, will shortly be repaired.

Speaking of the Girls' Training Colleges, I may as well say a word about the experiment made of late of introducing into all such schools, where English is the modern language taught, a young English girl, under the official name of *maîtresse répétitrice anglaise.* This is, I think, the third year since the experiment began, and from what I hear from several sources, English and French, the whole scheme is a great success.

I have the honour of being personally acquainted with two of those English young ladies, and their report is very satisfactory on every point of view. We had one here last year at the Girls' Training College, and while she made herself



THE GROUNDS OF THE BOYS' NATIONAL SCHOOL, DRAGUIGNAN.

universally liked by both pupils and mistresses, she gave efficient help to the teacher of English, herself making remarkable progress in the French language.

The idea is to gain for our girl pupil teachers a more thorough acquaintance with conversational English than they could acquire otherwise in the very limited time the school curriculum allows them for the study of English, and I may state, on my experience, that the result was excellent.

For the English young lady, the advantages are obvious. For a merely nominal fee (400 francs for ten months) and very slight duties (five hours a week conversational exercises with the girls), she enjoys a splendid opportunity of learning French, and may even complete her education, all the classes and lectures being opened to her. I have it on good authority from several quarters that the demands from French lady-mistresses exceed the number of candidates for these posts. It is to be hoped that the favourable report of those *maîtresses répétitrices* when they go back to England will encourage many young ladies to apply for the vacant places, and, they may depend upon it, they will not regret this step. I hope that this system may be adopted in the Girls' Secondary Schools (*Lycées de Jeunes Filles*); and I wish the same could be done for the boys. And why not? I am sure that many of your young pupil teachers would gladly embrace the opportunity of spending a year or two in a French Normal School; and I feel sure they would be made right welcome, and treated with all courtesy and kindness by pupils and masters alike.

BOYS' NATIONAL SCHOOL, DRAGUIGNAN.

But this is only a digression, for which I beg to be excused. And now I come back to my subject.

School Discipline and Organisation.

As will appear from the *emploi du temps*, or time-table, hereto annexed, our pupil teachers cannot be said to have an idle time of it while they remain at college. From 5 a.m. to 8 p.m is a good day's work, and I should rather find fault with it for being too heavy than too light an order. But I must own that the cramming which results therefrom is in some sort justifiable by the raw state in which our pupils come to us. Besides, they generally belong to the peasant or farmer class, and their vigorous constitution enables them to resist victoriously the rather severe *régime* to which they are subjected.

The word severe must be understood as applying to work rather than to discipline. The latter is much milder than it used to be, and many old masters there are who find the present system much too lax, and stick to the time-honoured maxim: *Qui bien aime bien châtie!*

But times are changed, and changed for the better, I do think. Our pupil teachers are no longer watched over and dunned by ushers at every step. They manage that kind of thing themselves, the senior or captain of the third year acting as usher, and being entrusted with the enforcement of school rules. However, the boys are not quite left to themselves, for, without speaking of the headmaster, whose presence is felt though unseen, one of the masters, in turn, exercises a general surveillance over the whole school, and at the end of his week's duty draws a report to the headmaster. The presence of a teacher is not meant to be a restraint to the boys; it is rather presented to them in the light of the affectionate interest of the teachers in all their concerns. It purports to be a model set before them of gentlemanly behaviour, and if it sometimes imposes self-restraint, it teaches self-respect and mutual esteem. The future elementary masters are thus taught to mix freely with their pupils without loss of dignity or authority, and, moreover, they learn by example that no master does *all* his duty who does not feel for his boys that kind of paternal interest which makes him watch with pleasure their games and frolics, as well as their sober times of work and study.

Cases of bad behaviour are exceedingly rare in Training

Schools. The punishments are few, and well calculated to cut short any attempt at insubordination. They are :—

1st. The deprivation of the Sunday half-holiday.

2nd. The reprimand inflicted before the assembled school by the headmaster for the first time, and by the Inspector of Academy the second time.

3rd. Temporary expulsion, inflicted by the Rector, on report of the Inspector of Academy.

4th. Expulsion, which means for the pupil thus punished the impossibility of ever entering the teaching profession.

The Normal School pupils being all boarders, and, as was said above, free boarders, there is no danger of interference from the outside. The influence of the school over the formation of the future teacher's mind and individuality is of paramount importance ; and towards the strengthening and widening of such influence are directed the whole thought and attention of the headmaster and his staff of teachers.

The results are such as speak very highly in favour of Training Colleges. All Primary Inspectors and Inspectors of Academies are unanimous in declaring that the best elementary teachers are such as have been trained in Normal Schools, and I have often heard those most competent school authorities wish that no elementary master should be appointed who had not been a pupil of a Normal School.

Unfortunately, from paltry motives of economy, the number of pupils in Normal Schools is very limited, and many elementary masters and mistresses are appointed whose training falls very much short of the standard of Normal Schools. The *Brevet de Capacité*, otherwise *Brevet Elémentaire*, is thought a sufficient title to appointments in rural schools, and when supplemented by the *Certificat a'Aptitude Pédagogique*, entitles the master to a nomination as assistant, or even headmaster, of any but the most important schools, reserved as a rule to Training College pupils.

The number of pupils at both Training Colleges of Draguignan is twenty-four, that is, eight per year. They form an *élite* of elementary masters, and not an inconsiderable number among them continue working and obtain the higher certificates of the *professorat*, and even of inspectorship and headmastership of Training Colleges.

The leaving certificate is the *Brevet Supérieur*, and this is supplemented after two years' probation as assistant-masters by the *Certificat d'Aptitude Pédagogique*, which gives them a right to the title of *Instituteurs titulaires*.

The career of the Training College pupils is watched with the greatest interest by their old teachers. The school is opened to them whenever they feel inclined to avail themselves of its hospitality, and they are sure to find in the headmaster and professors the best of guides in difficulties and best of friends in need.

As an outside master, I may be allowed to say (and this will be the *mot de la fin* of my paper) that my connection with Training Colleges has made me a warm friend to elementary teaching ; and I am proud to say that my pupils remain my friends.

HEADMASTER AND GROUP OF THIRD-YEAR STUDENTS AT DRAGUIGNAN.

SIR JOHN GORST'S EDUCATION BILL.

MR. BALFOUR'S Education Bill having blossomed into an Act of Parliament, exit the Education Minister *pro tem.*, and enter the erstwhile deposed one with his little Bill, the purchase price of which is the humble halfpenny, and upon which is to be found the names of Mr. Balfour, Mr. Chancellor of the Exchequer, and Mr. Solicitor-General in happy union with Sir John Gorst as co-backers of 'A Bill to amend Section 97 of the Elementary Education Act of 1870.'

The Bill, at the onset, quotes Sec. 97 of the 1870 Act, which, as all the world now knows, was enacted to relieve necessitous School Board areas, such areas being those wherein a rate 3d. in the £ yields not more than 7s. 6d. per head on the average attendance of the Board School under the jurisdiction of the School Board in question. The Bill is short, if not sweet, and so may be given in its entirety :—

1.—(1.) Section ninety-seven of the Elementary Education Act, 1870, shall have effect as if the sum of seven shillings and sixpence therein mentioned were increased by the sum of *fourpence* for every complete penny by which the school board rate for the year therein mentioned exceeded threepence. Provided that the said sum of seven shillings and sixpence shall not be thereby increased beyond a maximum of *sixteen shillings and sixpence.*

(2.) 'School board rate' means the rate in the pound on the rateable value of the district which would have produced the sum required in the said year for the purpose of the annual expenses of the Board, and actually paid in that year to the treasurer by the rating authority.

2. This Act shall from and after the *twenty-ninth day of September, one thousand eight hundred and ninety-seven*, be construed as part of section ninety-seven of the Elementary Education Act, 1870, and shall not extend to Scotland or Ireland, and may be cited as the Elementary Education Act, 1897.

In introducing the Bill Sir John who, by the way, went very near condemning the salaries now paid to teachers in London and the larger towns, gave some very interesting examples of the variation in the rate for maintenance in diverse districts by way of showing that a mere extension of Art. 97 would not meet the exigences of the situation. This was by way of leading up to the *sliding scale* upon which the new Bill seeks to be worked. Here are Sir John's words as to what the Bill would do :—

'It proposes that in all cases where the rate is 3d. and does not rise as high as 10d. to leave schools exactly as they now are. Where the rate has risen to 4d. the Government propose to read the 97th Section of the Act of 1870 as if the sum of 7s. 10d. were substituted in the section for 7s. 6d. This will bring more schools under the Act, viz., those in which the 3d. rate produces less than 7s. 10d., and the relief claimable is to be the difference between *the product of a 3d. rate and 7s. 10d.* When you come to a rate of 5d. in the £ the Act is to be read as though 8s. 2d. were substituted for 7s. 6d., and so the sliding scale will go up 4d. for every penny until we get to 2s. 6d., which is the highest rate to be provided for. In a district having so high a rate as this the Act will read as though 16s. 6d. were substituted for 7s. 6d.

The announcement of this peculiar sliding scale arrangement was received in the House of Commons with a running accompaniment of laughter, which turned to derision upon the announcement that the whole amount to be paid under this Bill—presuming that it becomes law—will be £110,602, in which is included the £43,000 which represents the amount payable under Sec. 97 as now existing. This was compared with the £600,000 to be paid under the conditions of the Voluntary Schools Act, and much dissatisfaction was expressed in various quarters that the amount to be given to necessitous School Boards should be but one-ninth of that set apart for the Voluntary Schools. It is not, however, expected that this discontent will bring forth amendments calculated to jeopardise the safety of the Bill, so that it may safely be predicted that the Necessitous School Boards Bill will soon become the Act of that name, if not without the deletion or insertion of a single comma, as was the case with Mr. Balfour's Education Bill, at least without any alteration of much significance, we may therefore, by the light of the statement lately issued by the Education Department setting forth the manner of the distribution of the new grant in aid under Sir John Gorst's sliding scale. In the first place London, with its moderate rate of 11d. in the £—as Sir John put it—will get nothing.

Secondly, of all the School Board districts in England and Wales, 794 will receive aid, more or less. Of these, 187 will receive less than £10 each, which, it may be remarked, will do but little to relieve any pressing necessity actually existing, and an amendment fixing a minimum, certainly much higher than £10, should receive much support, even if not ultimately carried.

It will cause but little surprise to learn that many anomalies will be existent under this Bill, but the statement given below will, we opine, exhibit something more startling in this direction than would be expected.

Name of School Board.	Grant per Scholar. s.	d.		Rate in the £. d.
Hinderwell (Yorks)	5	9	.....	6·
Carlton, Barnsley (Yorks)	1	11	.....	25·
Kingsbridge (Devon)	2	10	.....	6·
Devonport (Devon)	0	4	.....	12·5
Apsley Heath (Beds.)	6	6	.....	6·
Eversholt (Beds.)	0	3	.....	7·5
Steeple (Essex)	3	7	.....	7·
North Fambridge (Essex)	3	4	.....	20·5

Comment is needless, and so we proceed to pass in review some of the large School Boards which will come under this category.

Name of School Board.	Grant per Scholar. s.	d.		Rate in the £. d.
South Shields (10,921)	2	5	.....	8·5
Sunderland (14,136)	0	7	.....	8·25
Leeds (42,872)	3	2	.....	14·
Sheffield (32,273)	1	10	.....	13·
Ystradyfodwg (14,772)	5	7	.....	12·7
Swansea (11,871)	2	6	.....	11·9
Gateshead (11,443)	3	8	.....	10·9
Nottingham (25,110)	3	2	.....	13·

Perhaps the most striking case of all is that of Kidderminster, which, with an average attendance of sixteen hundred and fifty children, may receive £7 in further aid of their necessitous School Board district.

It is not, of course, to be denied but that in such places as West Ham and Tottenham, where the strain has long been felt, substantial relief will be experienced, and for this alone it would be insane inanity to make it possible or even excusable to throw out this sop to School Board necessity, wherefore, we are of opinion that within the next few weeks Kidderminster may have to thank the Government for their munificent grant of £7. Head Teachers as a whole will, at least, feel that another £100,000 is to be spent on education.

A TEACHER'S VISIT TO GREECE.

BY MISS J. M. DAVIES,
Head Mistress, Tennyson Street Board School, London.

II.

FORTUNATELY for those of our party who were teachers, the Cretan troubles, though looming large, had not at the time of our visit taken their present unhappy proportions, or we should have missed one of the pleasantest afternoons of the whole holiday. To seek an entrance to-day in a public or secondary school in Athens would be vain, for they are all closed to the children and are open only to the poor Cretan refugees. But at that time they were working away merrily enough, and we who had much admired the grown-up Greeks everywhere were most anxious to see their schools and to find out, if we could, what the training was like which produced these fine people—fine in physique and very refined in manner. The number of stalwart forms is quite striking ; from the very tall King and his fine athletic son, both now unhappily at the seat of war, to the waiters in the hotel, they meet the eye everywhere. Many of the latter, in appearance, look fit to sit in council with their King and Prince, and to help them guide the affairs of their country. Some people, we know, express disappointment at not seeing more examples of what, by the teaching of old Greek sculpture, we have become accustomed to consider the type of Greek beauty. But where do we find an unmixed type ? Certainly not in any nation with a stirring history, and rarely in the large cities of any country. But there were quite enough expressive dark eyes and well-shaped faces to make one believe that, whether the modern Greek is mixed or unmixed, he has at least been long enough in his country to have a greater right to it than anybody else. One can but regret to see just now that old controversy revived which, during the War of Independence, was used to discredit the popular belief in the long classic descent of the Hellenes—revived, too, from a similar motive and by people who doubtless this morning felt no sense of pain when they read over their breakfast that yesterday British ships had fired on the brave Cretans.

When speaking of personal beauty these remarks must be understood to apply only to the male population, not because it does not exist in the female, but because you see so few women that you cannot form an opinion of your own. People who have a good opportunity of judging informed us, however, that among the richer classes feminine beauty is not only quite common but is very striking. And the reason so few women are to be met in the streets is due to the old fear which had its birth in the dreadful days of Turkish rule. Then, it is said, every good-looking poor woman was swept out of the land. Of course the better-off kept out of sight, and seventy years of freedom have not quite broken down this custom, any more than they have got rid of the brimless hat of the priest. Poor women, to be sure, are to be seen at their rough labours ; but the overworked anywhere, more especially in a country which prides itself on being Oriental, are not to be taken far into account when speaking of

national beauty. The girl in the picture is a well-to-do villager's daughter, and the amphora or two-handled vase she carries is of the same shape as those used in Homer's days.

MODERN GREEK GIRL AT ELEUSIS.

But we must away to a school, a boys' school attached to the Normal Training College of Athens. The director, at whose invitation we made the visit, had become acquainted some years before at a German university with one of our number, and was quite willing to lay before us as much of his special knowledge as we wished to acquire. We certainly felt we had the good fortune to draw from a fountain head.

Outside, the building was quite unpretentious, but within everything, though simple, was both comfortable and adequate. In the first class-room we entered there was a number of sturdy little fellows all very intent on their reading books, some of which were handed to the visitors; but only one could make use of the loan.

But the faces were better than any book; closely cropped little heads surmounted broad shoulders, from which hung long striped pinafores down to the ankles, below which many wore those pointed Eastern shoes which end with a tuft, and which will remind one so much of a Chinese junk. In the next room a physiological diagram, 'made in Germany,' hung before a class of boys who looked to us about ten years of age. The teacher was naming the parts of the body, but not giving their functions. We understood this to be called 'Greek,' and it seemed to correspond to our class subject 'English,' and not at all to physiology. We enquired the age of the children, and were told 'Six.' We asked again, as they looked so big, and again were told 'Six.' Then to another room, around which were hanging portraits of men, living or dead, whom the Greeks delight to honour. Here a Geography lesson was being given by a student whom the other students were criticising.

At last we were asked into the playground to see *Drill*, and we found there a real *Kindergarten*, in which the children watch the growth of plants, from the seed, to the flower, and fruit. Orange trees laden with blossom added to the beauty of the spot, and taught at least one of us a new fact, that bloom and fruit are on this tree at the same time. Soon after we saw this further verified, for in those lawns in front of King George's palace, just behind the tram-lines, where we happened to be passing one day, men were stripping the trees of the fruit and yet leaving plenty of blossom behind. But to return to the playground. The boys were drawn up in ranks, and whilst going through their movements they looked like small editions of the Greek athletes, of whom we had seen so many in marble. We were told this drill was planned to revive the old Greek freedom of limb and the old national feeling. During the last few weeks have not events been looking as if the intention is having the desired effect? For some time we watched, and we watched admiringly, and then our little friends were massed together to give us a parting song. We could not tell the words, but the tune was that of our own National Anthem, for which pretty compliment we were most grateful, and only wished that we could each have spoken our thanks instead of only look them. What a pity that a common travelling language cannot be taught in all the schools of Europe. How many misunderstandings would be avoided. We quarrel now because we do not quite know what we all mean. Perhaps some one will say we should have a big quarrel before we settled which should be the common language. Surely we might fix on a dead one, and strip it of all that is unnecessary to our modern purpose.

Here we were! grown up people wishing to thank little children, but instead, standing by, like deaf mutes, with no language but the eye. We hoped this was not a failure, especially when on leaving the playground some of us received from the little men beautiful sprays of orange bloom picked purposely for us.

It may be thought we had trespassed sufficiently now on the time of the director, but he was good enough to say he was still at our service if we wanted anything more. So we entered his sanctum, and took notes of his replies to our questions, and we hope we made no mistake, for the linguist of the party was gracious enough to try German when the educationists looked doubtful over the Greek renderings. If, after all, our notes were not quite accurate, it is another argument in favour of that little common-travelling-language plan.

Yes, education is both free and compulsory, but compulsion, at least with boys, is quite needless, so earnest are parents for their children's welfare.

8. Ἄλευρον ευ=εϐ

εὖ γε εὐ γε νὴς εὔ ζω νος εὔ μορ φ
εὐ ώ δης γεῦ μα ῥεῦ μα ψεῦ μα ζ
γος ψεῦ δος φεύ γω ζη λεύ ω φ
λεύ ω ἱπ πεύ ω χο ρεύ ω φυ τεύ
ἄ λευ ρον.

Ὁ ἱπ πεὺς ἱπ πεύ ει. Τὰ ἴ α καὶ τὰ ῥό
εἶ νε ἄν θη πο λὺ εὔ μορ φα καὶ πο λὺ εὐ
δη. Τὸ ψεῦ δος εἶ νε κα κόν. Ψεύ μα
πο τὲ δὲν λέ γου σι τὰ κα λὰ παι δί α.

Τὸ ἄλευρον εἶνε λευκόν. Τὸ ἄλευρον
νεται ἀπὸ τὸν σῖτον. Ἀπὸ τὸ ἄλευ
γίνεται τὸ ψωμίον.

SPECIMEN LESSON FROM A MODERN GREEK PRIMER.

Inspections and Examinations exist, but not on the English plan; and the Minister of Instruction, who has some duties of oversight, receives a honorarium of less than £50 per annum.

The number of children to a teacher is sixty as a rule, but in the college schools for the higher subjects only twenty-five. What holidays? Half-day on Saturday (no Sunday duty), from two to four weeks in the summer, a few days in the New Year, and many festival days. (Perhaps no fête day is so popular as Independence Day, of which we have just read a good deal in the papers. We happened to be in Nauplia when the Nauplians were celebrating it, and were delighted with the brilliance of the illuminations, and the great joy expressed by the people there. Being English, of course we sympathised in commemorating freedom, and the Nauplians, knowing this, gave us an extra share of music, treating us to some of our national airs, and saluting us from the square in front of our hotel. They little knew then, more than we, that so soon after this pleasant exhibition of *camaraderie* our flag would be flying side by side with that of the Turk, whom they have such good reason for so heartily hating.) But this is a digression for which pardon must be asked, and we will return to the college. 'Are teachers civil servants?' we asked. Yes, and they receive pensions, to which they contribute 7½ per cent. of their salaries; on certain conditions they can retire after twenty years' service. Two-thirds of final salary is the highest possible pension. But teachers are an ill-paid class, and a young master cannot hope to marry unless he meets with a girl who has a respectable dowry. As every girl in Greece must be provided with a *dot*, this is perhaps not very difficult, but on the other hand women in Greece are in a minority, as in Italy, of five per cent.; putting these two facts together is easier than seeing how their sum affects the young pedagogue. Are there Evening Continuation schools? Well, not authorised schools, but voluntary effort sufficiently meets the case of the newsboys and the shoeblacks. We were delighted to hear the latter were looked after, not only because he, like his *confrère* is excused day school attendance, but because he is so numerous. Every other boy you meet seems to feel himself called to this work, and if you are not sharp he is down on your brown boots with his black brush before you know where you are.

Such is the summary of our facts gained from a gentleman than whom we could not have found a better authority. To add to the burden of our gratitude he was good enough to repay at our hotel in the evening the visit we had made, bringing with him a set of readers of which he is the author, and from which a page has been taken for our illustration; also the Greek Code, and more than one syllabus of instruction. It will be impossible ever to forget the afternoon spent in that Athens school with the young Hellenes.

Concerning the education of girls we discovered later on that the same provision as for boys is made by the State for them, but owing to the seclusion before explained they have not yet taken full advantage of it. The *dot* system also retards their progress. They are unwelcome in poor families, where brothers often have to remain single in order to marry off their sisters if they happen to have no father or one too poor to have paid twenty drachmas a month for twenty years to *The Hymeneal Society*, a society which provides dowries, for that payment, of 2,750 drachmas. This society's revenue amounts to about 36,000 drachmas per annum. But the elder girls must marry off before the younger, which often causes complications such as are not quite unfamiliar to readers of Bible story. It is pleasing to learn that the American Mr. and Mrs. Hill's efforts in founding the *Arsakeion* for girls in 1836 are still bearing fruit. The institution numbers 1,500 pupils, many of whom become schoolmistresses; the Government grant amounts to 1,300,000 drachmas. There are 40 professors and 59 governesses employed. The pupils, many of whom begin in the Infants' Department, are expected to remain for six years in the Girls'.

We also learned that within the last 20 years the daughters of the wealthy have shown a strong desire for knowledge, and that already many of them can speak two languages beside their own. Some are beginning to take an interest in politics, though to the present time there is but one *salon* properly so called in the capital. All the same, when the lamented M. Tricoupis was Prime Minister it was an open secret that his sister was a very influential person with her brother. And the Queen also is regarded with the greatest veneration and affection. Nor can we forget that there is a ladies' paper in Athens edited by Madame Callirhoe Perron, the lady who represented her countrywomen at the Chicago Exhibition, and that she is assisted by sixty women contributors. Taking into consideration the past of the country, and how recent is its history as a modern nation, one cannot but feel that all pertaining to national education is in a very hopeful state. And the University of Athens, which recently went so far as to admit a lady student, has a large number of hard-working graduates who in the long vacations betake themselves to German universities, there to study other modes of thought and action.

Summarising all these facts educational, we cannot fail to admire the zeal which prompts so poor a country to do so much for its youth, and there is no avoiding the inference that a people so minded will never easily be kept quiet in a back seat when at a European Concert they find the chief performers are so deaf to harmony that false notes are struck instead of true music.

LIFE AT A GERMAN GYMNASIUM.

By an ex-Gymnasiast.

III.

The Gymnasium is the feeding school for the universities. The pupil who successfully passes the final examination is entitled to enter any of the numerous German universities without further examination. The final product of the Gymnasium is very much like the successful candidate at, say, the London Matriculation. He knows Latin, Greek, and French, and sometimes Hebrew. He does not know English. His French is anything but practical and conversational. Nobody ever learnt to speak French at a Gymnasium. We learnt a good deal of French Grammar and prosody and etymology, and forgot all about it as soon as possible. I well remember the awe and consternation caused among the boys by the rumour that one of them, the son of the Dutch consul, read French books for pleasure! The almost total absence of foreigners encourages this merely theoretical instruction. I was the only foreigner in my class. There was another Englishman and a Frenchman at the school in my time. Those who are acquainted with the cordial dislike which is cherished towards the English in Germany, especially on the Rhine—a dislike which is more deep-rooted and intense than the traditional hatred for the French—will be pleased to learn that this feeling did not extend to the foreign pupils at this school. There was no difference made; each pupil found his level among teachers and pupils alike, and the benefits of a sound education at a ridiculously low figure—£5 per annum—were open to all comers.

The Latin began with the Sexta, and continued uninterruptedly for the full nine years. Cæsar, Virgil, Ovid, Livy, Cicero, and Horace were the authors read. Composition in Latin on a given theme was the highest attainment. French began in Quinta, and Greek in Quarta. In Greek we read Xenophon, Homer, Thucydides, Plato, and Sophocles. Translation from and into Greek was the summit of the requirements. Even now I thank my stars that I was spared that useless and wasteful Latin and Greek versification which is still practised in England.

In Mathematics we advanced as far as the Binomial Theorem, Spherical Trigonometry, and Solid Geometry. We had no co-ordinate Geometry or Infinitesimal Calculus. We received a very sound initiation into the structure and history of the German language, the theory and rules of composition, and the development of German literature. The history lessons were confined to Greece and Rome, Europe in the Middle Ages, and German (especially Prussian) history up to recent times. We learnt a little of French and next to nothing of English history. The Geographical Teaching was very sound and practical. There I found that world-embracing universalism with which German thought is so often credited. The splendid atlases brought out in Germany at abnormally low prices aided and encouraged this branch of our studies. There

was hardly a Gymnasiast who could not accurately describe the situation of Bristol, Birmingham, Edinburgh, Aberdeen, Dublin, or Belfast. Can we say the same with regard to Kiel, Nürnberg, Munchen, Ulm, Dresden, and Leipzig?

The Science Teaching began in Tertia, except Natural History, which was already taught in Sexta. The elements of physics, chemistry, and physiology were dealt with in a very elementary manner, and sadly hampered by the utter lack of practical work. There was a fairly complete collection of apparatus, but it did not include such essential things as an electric battery or a test tube. We had no experiments—nothing in fact but books and the exhibition of dusty apparatus, usually out of order. It is surprising how much I learnt of science in spite of these drawbacks. I believe it was chiefly due to the admirably clear manner in which Professor Schneider used to explain things to us.

It must, of course, always be remembered that this was not a *Realschule*, where they had well-appointed laboratories long before science teaching was dreamt of in these islands. The Gymnasium is eminently a classical school intended to train lawyers, theologians, physicians, and the higher civil servants. It is, in fact, the nursery of the future masters of the German nation and orthodox professional men. The future of Germany is moulded in the Gymnasium. Not of the Germany as we know it now—the pushing, active, ubiquitous rival of British trade, but of the Germany our fathers knew—the heart of Europe, whither all the currents from all the world brought their load of experience and humanity, where the idea of the human being—not the 'man' but the *Mensch*—found its fullest and freest development. Ever since the *Völkerwanderung*—that gigantic mediæval migration of races—Germany has been the originator or the largest participator in European struggles and problems. Crusades, reformations, revivals, civil and international wars, have kept the life-blood of races from stagnation, and the central situation of Germany has made it the high road of strangers who could not cross from west to east or from north to south without leaving some new idea or impression behind. This has given to German thought that breadth and profundity which for a long time gave it the lion's share of the world's mental work.

But, since the new Empire, the world has beheld with astonishment how this race of princelet-ridden, poverty-stricken thinkers suddenly assumed a formidable and almost commanding position in the business life of the world. The dreamer has awakened, and become a shopkeeper; and it almost seems that his dreams are left behind for ever. German philosophy and literature, once the pride of the race and the admiration of the world, is seen to languish and decay, while its place is taken by plastic art, by improved machinery, and by cheap and saleable articles of every-day use. German science and German technology, liberally endowed by the enlightened governments of the several states, will absorb more and more of the manufacturing trade of the world. Cheap labour, sound elementary education of the masses, and the discipline of universal conscription, are an invaluable aid to the factory owner. If you make the best article that science can produce, have the cheapest labour at your command, and submit the article to the customer in the most acceptable shape, you cannot help ousting every competitor.

Here we are then face to face with a new phenomenon in the world's history—a nation which in a generation has changed its entire character and position in the world. No wonder that the antiquated bureaucracy feels the strain of the vigorous democratic industrialism. Hence the stormy party feeling in the *Reichstag*, where the Ministry, responsible to the Emperor alone, is confronted by a bold and uncompromising opposition, barely kept in check by stringent press laws and *lèse-majesté* prosecutions. But the bureaucracy is doomed, and with it the old Yunkerdom and state-aided hierarchy.

This is manifest to all beholders in the decadence of the Gymnasium, not as an educational institution, but as a training school for *men*. I have hitherto dwelt on the former aspect of the school; the other side is far less cheerful and promising. A glance at the groups of Primaner or Secundaner who stand about on the playground during the intervals would tell a good deal to a man of understanding. Their only occupation is to ogle up at the windows of the large hotel opposite, or to detail to each other the latest anecdotes of questionable taste. They suffer from *ennui* and *fastidium*. They are *blasé*, and have gone through all the pleasures and dissipations which a luxurious town can offer. They are subject to *Weltschmerz*, a species of melancholy utterly inconsistent with a healthy youth. I find I have used nothing but foreign words in describing these symptoms. Happily the English language is free from these words, and happily the nation is free as yet from what they signify—comparatively free at least; but the contrast is most striking for one who has seen both.

The teachers and the whole structure of educational authority—wheels within wheels—are powerless to check the scandalous immorality of German youth which has given rise to the saying that there is nothing left for spoiling in a Gymnasiast. The example of the Universities, where it is *de rigueur*, has made such delinquency fashionable at the Gymnasiums, which are always aping the customs of the students. I do not for a moment maintain that loose conduct is universal among the pupils. There are always half-a-dozen fellows in each class who are clean living and clean spoken; but as a rule they are not popular, and are cried down as *Philister*. I myself was one of the latter, and was called the Puritan, or Quaker, chiefly since, on the occasion of a much-coveted examinational success, I refused to treat my class to the customary drinking bout.

The low moral tone prevails from the highest to the lowest. The former often set the example. I well remember the day when the Prince of ——— (it would be cruel to give his name, and his wife is dear to the English people) appeared at school after several days' absence with his hair cut in the most primitive fashion. He told a tale of how he had been kidnapped by two men, who had taken him across the Rhine and cut his hair. It appeared afterwards that he had cut his hair himself to give colour to his story, and that he had in reality been engaged on an expedition in which a gardener and his daughter played conspicuous but irreconcilable parts.

This shady side of German school life is accompanied on the other hand by a certain ripeness and breadth of judgment which I have never found equalled in this country. Under Herr Evers* I had the good fortune to enter a particularly brilliant and promising class, which, I am told, has not since been got together to the same extent. One boy of 19 in particular, since deceased, wrote poetry and novels which, for largeness of view and insight into the lights and shades of human character, left nothing to be desired. I have not seen any of my brilliant and promising schoolfellows distinguish themselves. Almost all went to the Universities, and returned after three or four years, sodden, stout, and sedate, often to renounce their professional aspirations and to find a more remunerative occupation in commercial circles. The vigorous and lofty idealism which is said to have marked the University life of '48 and the beginning of the century, is lost in the elaborate formalities of the *Kommersbuch*, the standard text-book of the science and art of drinking beer:—

'Oh! alte Burschenherrlichkeit
Wo bist du hingeschwunden?'

The student, having acquired the prescribed capacity for beer, and scraped through the State examination, is again thrown on the hands of his parents, who have to find him a situation far below his original aims, or keep him for five or ten years before he can earn his living by the law, the healing art, or the art of killing men. The learned professions are overcrowded; literature is almost dead, and the historical German supremacy in that department has passed to the English-speaking races. The country is pre-occupied with its industrial development, its colonial expansion, and ceaseless preparation for the next great war. It bristles with sabres and bayonets, turned towards the east and the west, and often inwards towards the breasts of a long-suffering and more and more exasperated proletariat. The longed-for unity of the German Empire has been gloriously accomplished. Power and wealth have followed. What next? Happy the nation that has something left to strive for!

* Now Professor Evers, Director of the Barmen Gymnasium.

VISITS OF INSTRUCTION.

VII.—A VISIT TO A COAL MINE.

ANY one travelling in a coal mining district is familiar with the outside appearance of a coal mine, but few are acquainted with its underground mysteries. Many persons are satisfied with knowing that miners get coal from there, and that their

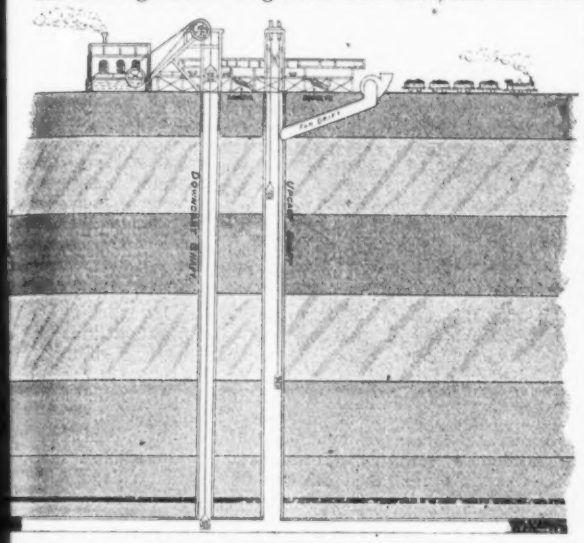


FIG. 1.—SECTION OF A COAL PIT.

calling is attended by many dangers. This, however, is not sufficient for teachers who have coal mining on their lists of lessons, and as this is included in circular 369, as well as being a lesson which is well adapted for treatment in the various standards, it should be a favourite.

A coal mine is a most interesting place to visit, but one which is scarcely suitable for taking a party of children on a 'Visit of Instruction.' But teachers who live in colliery districts will find that they will be amply repaid should they visit a coal mine. The managers, masters, and all connected with mining, as far as the writer is concerned, have been most kind and courteous, and have gladly granted permission to visit the mine while the colliers were at work. After being down one in company with other four teachers, I had an unsolicited invitation from another mine—one of the largest in South Yorkshire, to visit it at my convenience, and take a dozen friends with me. I only mention this to show that if any one has a desire to go underground, it is more than probable that that desire can be easily satisfied.

For the sake of those who are not so favourably situated for visiting a coal mine, I propose, in the present article, to give a short description of a visit to one, and shall endeavour to show by means of a plan, and a few illustrations, the method of working coal as usually adopted in Yorkshire. The method here described is the 'Long Wall' system of getting coal, and after the description of it, the suitability of the name will be seen. The other chief method of getting coal is the 'Pillar method,' but as I hope to describe this in a future article on 'Iron Mining and Manufacture,' nothing will be said of it here.

Long before we reach the pit, the outside works may be seen standing out prominently, the most striking feature being the pair of large vertical wheels placed side by side over the top of the shaft. They may be seen revolving in opposite directions as we approach the pit. There may also be seen two thick ropes, one to each wheel, coming from a building near. Into this building—the engine-house—we were first taken. Though, of necessity, so much blackness and dust is everywhere around, it does not seem to penetrate to the engine house. Everything is scrupulously clean, and the steel and brass work shines so that it would almost do instead of a mirror. The engine works a large wheel or drum to which the ropes before seen are attached in such a way, that as one is wound round the drum the other is unwound. They are made of iron wire, and are attached at the other end to the cages which go up and down the shaft. The ropes must, of course, be very strong and sound. They are examined daily with great care, as the lives of the miners going down or coming up would be endangered by a faulty rope.

The engineer has to be very careful not to over-wind the ropes, and he has also to slacken the speed as the cages reach the top and bottom of the shaft. There is an indicator to show when the cages are near the top and bottom. On this the engineer keeps his eye. He feels the responsibility of his position, for he says that people appreciate the work of the railway engine driver who draws up his train along the platform, but is not confined to a few yards; he, however, must stop his engine scores of times a day, and must do it precisely at the right time, not having a margin of more than an inch. A bell rings in the engine-house when the cages are ready to be raised or lowered.

From the engine-house we next went to the lamp room to be supplied with a safety lamp before going down. In the mine we visited, the most modern type of lamp was used. It is lit by means of electricity. A platinum wire bends over against the wick, and to light the lamp, the bottom of it is placed in contact with a button connected with an electric battery. The wire at once becomes white hot and ignites the wick of the lamp. Any one endeavouring to get at the light by unscrewing the bottom off the lamp, will find their attempts useless, for as the bottom is unscrewed the light gets smaller and smaller till, before the bottom comes off, the light is out. Nor can the lamp be lighted again till the bottom is put on, and then only by electric contact. A sudden jar will sometimes put out the light while the miner is at work. Should he have a match (contrary to regulations) he knows he need not strike it, for he cannot light the lamp. There are several electric buttons placed in different parts of the workings, and to one of them the man must go to get his lamp relighted.

Being now supplied each with a lamp, we made our way to the top of the shaft. We took our places in the cage (instead of empty waggons) and the signal 'Ready' was given. At once it seemed as though the ground was giving way beneath our feet. We went at a great rate on our journey of a quarter of a mile into the bowels of the earth. Half-way down, of course, we met the ascending cage. The sensation after passing the cage was most peculiar. Any one not accustomed to it would feel certain that he had ceased to descend, and was as rapidly ascending. He would soon, however, find himself at the bottom of the shaft. Here all was well lighted up with electric lights. We were met at the bottom by a man who

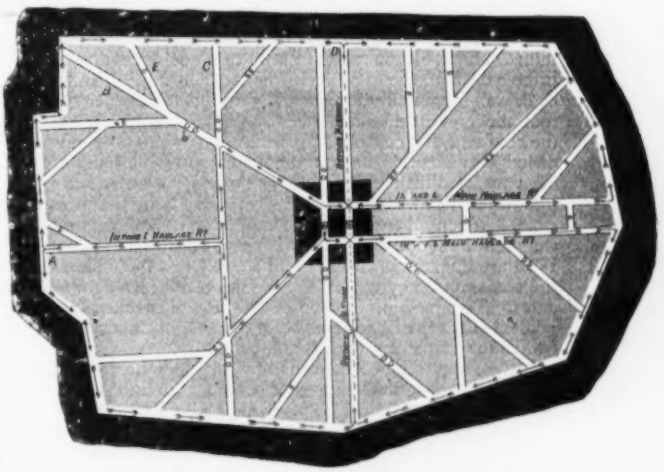


FIG. 2.—PLAN OF A COAL PIT.

came to examine our lamps, and then we were taken to the 'Council Chamber,' as our guide laughingly called a small room where the deputies meet the manager and make their

reports on the condition of the mine before the next shift are allowed to work. I ought here to say that work goes on in the mine without intermission from Monday morning to Saturday. There are three batches of men working eight hours each, and taking their day and night turns in rotation. We were kept in the small room till our eyes got accustomed to the rather meagre light of the mine farther away from the shaft bottom.

We were next conducted along the many passages and

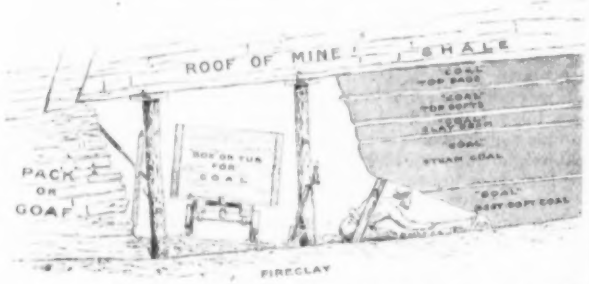


FIG. 3.—SECTION OF THE 'WORKING' FACE OF A COAL MINE, SHOWING COLLIER 'HOLING' OR UNDERCUTTING.
PP, Props or Posts; L, Lids or Caps; S, a Sprag.

gates towards the coal-face, taking upwards of half-an-hour to reach it. At no place up to the present had we had any difficulty in walking upright, the passages being large enough to admit of horses for drawing the trucks. The main roads are wider and loftier than the branch gates or roads, but into these small ponies could easily get. They draw the loaded corves to the main roads, where several are fastened together, and a large powerful horse draws them thence to the shaft bottom. Of course there are tram lines laid for the corves to move on.

At length we reached the coal-face, and found the colliers busy getting the coal. Many different methods are adopted in getting coal, depending upon the thickness and character of the seam, or of the seat-earth and roof. The chief aim in them all is to get the coal with as little small as possible. One of the commonest modes of working the coal is by '*undercutting*,' that is, instead of hewing out the coal directly, the miner takes out the dirt from underneath.

He begins at the end of the gate, and undermines the coal for about eleven yards, say, first to the right. He takes out as little dirt as possible, and this is thrown behind him. As he cuts underneath for three yards, or sometimes even up to four or five yards, the working space is very narrow. He has to sit as in Fig. 3, or even lie on his side. The coal is kept from falling by being carefully propped. When he has undermined about eleven yards along the coal-face, and two or three yards in, the props are then taken out. The mass of coal, weighing many tons, usually at once falls, leaving the roof above. If it does not, then by putting the pick in between the roof and the coal, it is soon made to drop. Being thus dislodged violently, the coal breaks up along various lines of cleavage, and little remains for the miner to do but to put it into the corve at the end of the gate in as large lumps as possible. When all the dislodged coal has been thrown into the waggons, he proceeds in the same way on the left of the gate. But the miners at each of the adjacent gates have been doing the same, and they work till they meet midway between the gates. This is going on along the whole of the coal-face, and readers will see that in this way the whole of the coal is taken out as they advance towards the boundary.

If the gates cannot conveniently be made near enough for the coal to be worked from their ends, a tram line is laid down in front of the coal-face. This is shown in Fig. 3.

The dirt is thrown behind into the place lately occupied by the coal, but along the sides of the gate it is more carefully and densely packed, to support the roof and keep the passages intact. The loose material is called goaf or gob. After the props are taken out, the roof settles and squeezes the loose dirt into a small space. But it would never do to have the roof giving way near the shafts. Hence the coal near the shafts is left unworked, that necessary for the passages only being taken out, and even the sides and roof of the passages are strengthened by masonry. The unworked coal near the shafts is shown in Fig. 2.

We were taken along a considerable portion of the coal-face. In the places where the miners were busy undercutting we could walk easily enough, but in some places we came to where the coal had just been let down. It then filled nearly the whole of the little space between the coal and the rubbish, and we had to crawl over the heap as well as we could. The safety lamps described above gave an excellent light, quite as good as a naked candle, and by their help we had no difficulty in making our way, except at the places where the coal had just been let down.

The section Fig. 1 is diagrammatic, and represents the simplest possible arrangements, but there are often several beds or seams, and sometimes a bed abruptly disappears at a '*fault*,' to reappear again at a higher or lower level. The presence of faults adds largely to the difficulty and expense of working. The Hardy Patent Pick Company, Sheffield, publish a large coloured sheet, mounted on stiff cardboard and varnished, specially prepared for the use of schools, and supply it free. The section therein shown illustrates very well indeed the method of working a mine with more than one seam, and also shows the methods adopted for reaching a seam which has disappeared at a fault. I am indebted to the Company for leave to reproduce a small drawing on their sheet, showing a miner undercutting. This is shown at Fig. 3.

It will be seen from Fig. 3 that a coal seam is not the same throughout, but may consist of several kinds of coal. It is often found advantageous to cut out the common coal from the middle of a seam instead of undercutting the whole seam. When the props are taken out, the top portion falls, and is cleared away; the lower part can then easily be cut out by chisels.

In going along the passages we several times came to doors and sheets. The doors are always in pairs rather near together. The purpose they fulfil is to direct the fresh air from the shaft all round the workings. If these doors were not employed, the air would simply come down one shaft and make its way by the shortest route to the other. I ought here to say that there are always *two* shafts to a mine: one for general haulage purposes, and by which fresh air enters the mine, called the *downcast* shaft; and one by which the foul air leaves the mine, called the *upcast* shaft. The two shafts are near together, but the air is so directed by doors and sheets, that it must go to the farthest part of the workings before it can return on its way to the upcast shaft. The upcast shaft may also be used for haulage, as shown in Fig. 1, but whether it is or not, I believe the Government regulations demand that there shall be cages and haulage machinery ready in case the downcast shaft should be injured by an explosion. The survivors in the great disaster at Micklefield recently were rescued by the upcast shaft, as the other was injured and could not work.

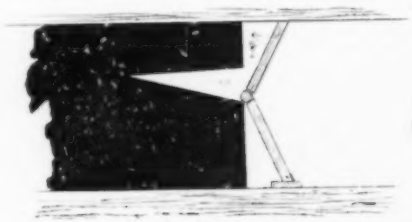


FIG. 4.—CUTTING COMMON COAL FROM MIDDLE OF SEAM.

The ventilation of a coal mine will perhaps be best understood by following a portion of the fresh air from the bottom of the downcast to the upcast shaft. It goes along one of the main roads, and is directed forward towards the coal-face. It would return by any of the branch roads if the doors were not there to prevent it going along the shorter route. If there were only one door, say in passage C, Fig. 2, and this were opened to allow the passage of trucks or persons, the air would then be unimpeded along this shorter route. It would go

along passage C, leaving all the workings from Fig. 2A, to Fig. 2C without their supply of air. And as there is continual traffic along all the passages, the air would very rarely be forced all the round, and the distant parts of the mine would thus be left badly ventilated and in a dangerous condition. To guard against this the *two* doors are used. They are never open together. If a truck is coming, say, from the coal-face, the door is opened, and it passes in between the two doors. As soon as it is through, the first door is shut. Before going much further it comes to the other door, which is opened, but as the other is shut, the passage is still closed to the air current. In Fig. 2E, a sheet across the passage is sufficient. This is lifted or pushed aside to allow the passage of men or trucks.

Having thus been directed to the coal-face, the air current divides as at Fig. 2A. Let us follow the portion to the right. It goes all along the coal-face, and being prevented from leaving it by any of the passages because of the doors and sheets, it reaches Fig. 2D, when it meets another current which has also been round another portion of the workings. The air goes along the air return, but at Fig. 2X, it has to cross one of the haulage roads carrying pure air, in order to reach the upcast shaft. The way this is accomplished is shown in Fig. 5. The air return is taken over the in-draught, and in

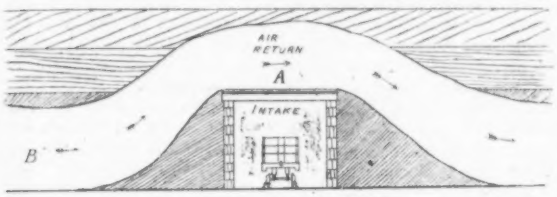


FIG. 5.—AIR-CROSSING.

order that there may not be any resistance to its free passage, the sectional area of the part A must be as large as the part B. These places are called *air-crossings*. The two passages are separated from each other at the crossings by strong boards or iron girders. When an explosion takes place, it often destroys the air-crossings, and it is because of this that the choke-damp is so fatal in the distant parts of the mine. The in-draught goes along as far as the destroyed air-crossing, and then returns to the upcast shaft by this short circuit. The first work of a rescue party is to restore the air-crossings, so as to secure ventilation in the further parts of the mine.

In former times fires used to be kept burning at the bottom of the upcast shaft to create an up-draught, and draw the air from the workings. But now large fans are nearly always used at the top of the shaft. They are kept going night and day. An automatic register attached to the machine shows the number of revolutions, and the speed must not fall below a certain rate. By means of these large fans air is efficiently drawn from the various parts.

There now only remained the stables to visit. These were excavated from the sides of the large passages near the shaft, and very commodious little places they were, quite as comfortable as most stables, except that there was no light. They were all white-washed, and very clean. I was under the impression that only small ponies were used, and I was surprised to see many large horses, nearly as large as railway dray horses. There are, of course, several ponies for use in the smaller passages. When once the horse or pony goes down into the mine, it never again, as a rule, sees the light of day unless it is ill. In some cases of illness the animals may be brought up again to the surface.

Having now seen all the various parts underground, we made our way to the shaft bottom and took our places in the cages. On the signal being given, we were hauled up. After meeting the descending cage we had the same peculiar sensation as when we went down. We seemed to feel ourselves going *down* instead of up. But we were soon again in the light, and stepping out of the cage on the surface, we could not but feel thankful to our genial guide, and congratulate ourselves on having spent a most enjoyable, instructive, and interesting visit.

EDUCATION ABROAD.

A REMARKABLE and instructive article on "La Jeune Egypte" appears in the *Revue de Paris* from the pen of M. A. Chevalley, who has been in Cairo for three years, and has seen Egyptian youth at work and at school. His professorship at the Tewfik College brought him into contact with all the promise and intellect of Young Egypt, and his observations cannot fail to be interesting to English as well as French readers. The future of Egypt is destined to be largely influenced by the nucleus of native talent to be found in the various Government offices, and the picture drawn by M. Chevalley of these young men is certainly striking. They are often very poor, but they speak four or five languages and are acquainted with every detail of Egyptian life. This class of well-educated Government officials was the aim and object of the drastic educational measures of old Mehemet Ali. With characteristic energy and a strong flavour of Oriental despotism, that famous Khedive established at a single blow the most up-to-date system of education in the midst of the most barbarous surroundings. The instruction in his schools was free and compulsory, and droves of young fellaheen were impressed into school, clad in flashy uniforms, and made into officers and scribes at Government expense.

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MANY of these schools still remain, such as the Polytechnic and the Medical Schools. Only the uniforms have disappeared, after some little struggling. The old system did not aim at educating the people, but at turning out officials. It reached barely a hundredth of the population. The schools were indeed supplemented by missionary efforts, and by the old native schools, but even now the bulk of the population does not enjoy a good primary education in the European sense. The Government schools are really preparatory courses for entrance into one of the three secondary schools at Alexandria, Cairo, and Assiut. European languages are taught exclusively by the Series method, which appears to be indigenous to Egypt.

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THE spectacle of some 500 candidates, aged 12 to 16, from all parts of the country, and clad in the most varied garb, assembling in the ancient Arabian palaces to undergo their examinations, is one of the most picturesque of modern Egypt. Of all the modern languages, French is the one most usually studied. But English is coming more and more into vogue. At present the number of students of French is 2,928, and of English 2,279. It will be interesting to see how soon the latter will outstrip the former.

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THE *Revue Pédagogique* contains a well-written reply to M. Fouillée's article in the *Revue des Deux Mondes* on youthful criminals, the alarming increase of which has given much food for thought to French economists. Among the causes which may account for this deplorable state of things the author emphasises the weakening of the family ties, and, curiously enough, the smallness of the families reared by French parents, which impedes a natural youthful development. The increase in grave crimes by youthful offenders goes hand-in-hand with the increase of youthful suicides which has been observed in France, Italy, and Germany. England is not much better off, as the 1895 reports show. 'And when the English,' our contemporary quaintly adds, 'happen to speak ill of themselves, we may believe them.'

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THE same grave question is treated by M. Mutelet in *L'Instruction Primaire*. To the causes above referred to he adds the freedom of the supply of alcoholic beverages established in 1880, the lack of control over the licentious press, and the leniency of juries, who accept the least excuse for youthful delinquencies.

AN article which enables us to a certain extent 'to see oursel's as ithers see us' appears in No. 13 of the *Allgemeine Deutsche Lehrerzeitung*. It is on Primary Schools in England, and is, on the whole, very appreciative. But there are two severe criticisms. One concerns the teaching of reading by the pure spelling method, which has been abolished long ago in German schools, and is peculiarly ill adapted to English orthography.

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THE other criticism concerns the arrangement of class-rooms. 'The nerves of the teachers are severely taxed. The class-rooms are divided off by partitions of wood only breast-high, the upper parts being of glass. No teacher pays the slightest regard to his neighbour. Each one makes his pupils read, recite, or sing as required. The neighbour must put up with the disturbance as best he may.' And we know well that the state of things described is by no means the worst. The absence of interpenetration of voices in Germany is a distinct advantage.

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THE Pestalozzi Monument at Zürich is to be one-and-a-half times life size, of bronze, with illustrative reliefs. It is to cost 70,000 francs. Of these some 48,000 have already been subscribed, including 44,000 from the canton of Zürich alone.

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THE School Budget of the town of Zürich amounts to no less than 1,900,000 francs. To these must be added 192,500 francs for maintenance of buildings, 54,000 francs for rent and furniture, and 25,000 francs for baths and heating!

* * * * * *

A VERITABLE trades union amongst the teachers of Denmark is in course of formation. It is to work for the improvement of teachers' salaries. They are, as a rule, fairly high; but as they are in the hands of the communes, there are many local differences. It is proposed to boycott communes paying low salaries.

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THE Communal Council of Palermo has provided a new and improved scale of salaries. They are now to vary from 1,200 to 2,200 lire for male, and from 900 to 1,700 for female teachers. The new order of things also includes a system of evening continuation classes.

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THE educational condition of Portugal is known to be bad, but how bad it really is can only be realised by reading the figures quoted in the *Tribunado Povo*. In Lisbon, with a population of 301,206, only 145,366 people can read and write. In the district of Leiria there are 192,000 illiterates among 217,000, and in Guarda 213,000 among 250,000 inhabitants. No wonder the sun of Portugal has set.

The Principles of Practical Book-keeping. By Andrew Sarll, A.K.C. London: George Gill & Sons.

Some time ago we had the pleasure of recommending in the most favourable terms an early issue of this work. Mr. Sarll has now produced a thirteenth edition in which the 'Introductory Exercises' have been revised, the 'Graduated Exercises' recast, the 'Examination Papers' increased in number, and all parts of the work accompanied by explanations both full and complete.

We can only reiterate that we consider it in every sense a thoroughly practical work. The author is known to us as a teacher of long experience, and from our special knowledge of the subject we think it would be hard to find a manual to surpass this one in excellence and cheapness.

OUR SCOTCH LETTER.

Modern Language Teachers. A meeting of the Association of Teachers of Modern Languages in the Secondary Schools of Scotland was recently held in Edinburgh. Dr. Scholle of Aberdeen, the President of the Association, delivered an opening address, in which he pointed out the necessity of union among modern language teachers, and the advantages to be derived from such an association. He also called attention to some of the difficulties against which modern language teachers in Scotland have now to contend, and showed in what directions the Association should strive to bring about improvement. The rules of the Association, as drafted by the Committee, were afterwards submitted and adopted.

Scottish School Board Association. The Scottish School Board Association has now been formed. The objects of the Association are stated to be: 'By organisation to protect and promote the interests of education, as these may be affected by legislation or by the administration of Government departments, and, if necessary, to take action in relation to all matters affecting the educational welfare of the country.' That the formation of the Association is not unanimously approved by School Boards is shown by the remarks of the Rev. Dr. McLaren, Chairman of the Larbert School Board, and a former President of the Educational Institute of Scotland. In laying on the table a communication from the Association, Dr. McLaren said his Board had wisely resolved to have nothing to do with it. The Association, in his opinion, was one to afford some men, who had more time at their disposal than they should have, the opportunity to meet together, and perhaps dine together. For what it had been formed he did not know, but it seemed to be a kind of trades union.

Sloyd Association of Scotland. The Annual Meeting of the Sloyd Association was lately held in St. George's Training College, Edinburgh, Mr. Struthers, H.M.I., in the chair. The Secretary (Mr. R. G. Dickson, M.A.) submitted the Annual Report, which showed that the Association had made steady progress during the year. Reference was made to the Congress at Perth as having done much to cause teachers and others to take an interest in the subject. The Chairman, in moving the adoption of the Report, pointed out that the chief business of the Association was to put before teachers all the beneficial educational results which followed from manual training, and also the pleasure which teachers who undertook it experienced in the work.

The Bible in Schools. The Glasgow branch have had a lively discussion on the question of the Bible in Schools. The more advanced members of the committee of management had succeeded in getting a majority of the committee to accept a resolution advocating 'a national system of education on a purely secular basis.' The branch refused by a large majority to adopt the proposed resolution, and Mr. Forbes in consequence resigned his position as a member of committee.

Hamilton Branch of E.I.S. The Hamilton branch of the E.I.S. has increased so largely in numbers that the hall in which the meetings were formerly held is now too small, and a larger hall has been secured. At the last meeting of the branch, Miss Hamilton, L.L.A., F.E.I.S., of the Pupil Teachers' Institute, Glasgow, delivered an address on 'Sewing,' in which she advocated a Code limitation of the size of classes for sewing, as in the case of cookery, and more practice in cutting-out in the senior classes, with permission to run up the seams with the sewing machine. Miss Hamilton would relegate much of this work to Evening Continuation Schools, where more of these subjects of practical utility should be taken up instead of in the elementary day schools, and she concluded with a somewhat unfavourable criticism of the Pupil Teacher sewing requirements.

Decline of Parental Control. The Aberdeen branch of the Secondary Teachers' Association held a meeting lately to discuss the question: 'The Influence of Parents: is

it on the decline?' The subject was discussed from the clerical, from the scholastic, and from the parental point of view. All agreed that matters are certainly not improving in this respect, the Rev. Dr. Cooper holding that the influence of parents, in Scotland at least, is very much on the decline, and that things are daily getting worse. The main cause of the decline is, in the Rev. Doctor's opinion, the enormous increase of self-indulgence. Parents are indulgent to themselves, and they do not see why they should not be indulgent to their children. One speaker went the length of asserting that the luxurious and indulgent habits of the present day were sapping the sturdiness and robustness of character for which the Scottish people have hitherto been famous.

Gaelic Teaching. The large deputation which recently waited upon Lord Balfour of Burleigh, the Secretary for Scotland, to urge upon him the necessity for more systematic teaching of Gaelic in schools in the Highlands, did not receive much encouragement from his lordship. The main object of the deputation was to make two requests, first, that Gaelic should be recognised as a class subject, and second, that a change should be made as to the provision for the teaching of Gaelic as a specific subject. Lord Balfour stated frankly that the first request was not likely to be granted, but that he and the Department were entirely in favour of the use of Gaelic for the purpose of explaining English, and that everything possible would be done to facilitate its use for that purpose. Further than this his lordship was unable to go.

Irish Teachers' Certificates. The Lord Advocate, in reply to a question in the House of Commons, has stated that Irish Teachers' Certificates will not be recognised in Scotland as qualified to earn grants.

Teachers' Guild. The Glasgow and West of Scotland branch of the Teachers' Guild of Great Britain and Ireland held their annual conversazione recently. The President, Mr. Luom, delivered an address on 'The Relation of the Teacher to the Parent.' He contended that the meetings between parent and teacher were too few. In the forefront of the teachers' qualifications he placed the ability to impress and tact to manage the parent. He urged parents to combine with the teacher in a training such as would make the pupil self-reliant, self-respecting, able to cope with the impediments in his path, and determined to persevere even when he found the task unpleasant.

E.I.S. Benevolent Fund. 'A would-be subscriber' in a contemporary makes the suggestion that, in order to mark the Queen's Diamond Jubilee, it would be appropriate for every member of the Educational Institute to give a voluntary contribution of at least one shilling to this fund, the sums for each branch to be forwarded to the General Treasurer before the close of the financial year, or handed to the President at the annual meeting in September next. The Benevolent Fund is, up to the present, quite equal to the demands made upon it, but the suggestion is nevertheless worthy of consideration.

Singing in Schools. Mr. Adamson, Superintendent of Singing in Dundee Board Schools, lately delivered a lecture to the Edinburgh section of the Incorporated Society of Musicians on the subject of 'Singing in Schools.' Mr. Adamson observed that there was no age too early at which to train the human ear, though great harm might be done through forcing the voices of children. He explained the best methods of imparting instruction in vocal music in school, illustrating his remarks by a series of exercises in vocal drill, and by ear exercises and tests, that were performed by a number of pupils from a public school. In conclusion, Mr. Adamson advocated the introduction of the Staff Notation as a compulsory subject in the upper standards of the public schools of the country.

E.I.S. General Committee. The Edinburgh District of the E.I.S. has held its annual meeting, and considerable interest was thrown into its proceedings by an attempt, a feeble and half-hearted one as it turned out, to elect a lady as one of its representatives on the general committee. Two ladies and a gentleman were proposed for one vacancy, the other vacancy being filled by a West Lothian member. One of the ladies being lowest in the first vote was dropped, and the final vote was taken between the remaining lady and the gentleman. Had the lady members combined their votes the lady would certainly have been carried, but a number of those whose nominee had been defeated in the first vote, having considered the bringing forward of a second lady candidate a breach of faith, voted for the gentleman, who was accordingly elected. So much for the pretended zeal of the ladies of the Edinburgh branch to be represented by one of their number on the General Committee.

Scotch School Board Electorate. The present position of the Scotch School Board Electorate, under which a very large number of ratepayers have no voice in the elections, has been the subject of a question in Parliament, and the Lord Advocate has promised that the matter will receive consideration before the next triennial election.

Leaving Certificate Examination. It may be well to direct the attention of teachers interested in the forthcoming Leaving Certificate Examination to the following extract from a recent circular issued by the Secretary of the Scotch Education Department:—'In regard to their Lordships' circular of the 7th December last, sent to State-aided Schools, I am to explain that, while my Lords are unable to hold on examination at, or in connection with, a school from which candidates are presented only in Arithmetic and English of the Lower Grade, this rule will not preclude pupils of a school from being presented in these subjects only, in cases where some of the candidates are presented in one or more of the higher subjects of education, and where my Lords have agreed to hold an examination.

Assistant Teachers and School Board Elections. The Assistant Teachers' Associations are determined to lose no opportunity of using their organisation for their professional interests. At the recent election of the Metropolitan School Board, the Edinburgh Assistant Teachers' Association adopted five of the candidates, and issued slips containing their names to every member of the Association for distribution amongst their friends, with the recommendation that these five should be supported at the poll. It may be stated that all five were successful. The Aberdeen Assistants have put to the various candidates for the School Board of that city a series of questions bearing upon such subjects as the employment of untrained teachers, appointments to vacancies in a higher grade, canvassing for appointments, the initial salary of lady teachers, size of classes, uniform school hours for all schools, etc. The replies are to be submitted to a meeting of the Association held prior to the polling day.

Assistant Teachers. The Ayrshire Branch of the E.I.S. have resolved to request the School Boards at present being elected to take into serious consideration the increasing dearth of male assistant teachers, and, in view of the fact that the great majority of these must remain assistants for life, to materially improve their status and emoluments, in the educational interests of the country.

Fifeshire Branch S.A.T.A. Mr. Kaiglin, Leslie, President of the Fifeshire Branch of the Scottish Assistant Teachers' Association, in his retiring address referred to the various topics of interest to the profession generally, and to assistants in particular. In the matter of salaries, he demanded that every Board should have a reasonable and satisfactory scale. The primary aim of education he held to be the making of thoughtful men and women. Children should be taught how to study, and to study for the love of it. For fostering this habit he commended the formation of school libraries. Tenure of office and superannuation he considered highly desirable, and he advised that they should be persistently pressed for until granted. He concluded by supporting the proposed departmental system as, at least, a partial solution of the assistant question.

Is Teaching a Profession? 'Is Teaching a Profession?' was the subject of a paper read by Mr. David Williamson to the members of the Dundee Branch of the E.I.S. the other Saturday. Mr. Williamson first referred to the time when the priest monopolised all the learning that existed, and to the separation of employments that gradually took place, leaving teaching as the only member of the original quadruple combination not fully recognised as a profession. Teaching, he feared, could not claim fully to rank as a profession until the training of teachers became incorporated into the Universities, and took rank with, and had provision made for it similar to, the other professions. He condemned the various back-door entrances to teaching, and demanded that efficient scholarship and efficient experience in teaching should be possessed by all licensed teachers. He also claimed for teachers, as the best judges, that they should be allowed some voice in the settlement of the conditions and subjects of teaching. In regard to what he considered the unsatisfactory position which teachers and their work hold in the public estimation, he maintained that teaching was higher work than that of the doctor, the minister, or the lawyer. Teachers, he thought, could do something to elevate the public estimate of their vocation by scrupulously conserving their dignity—dignity of dress, of manners, and of address.

The late Mr. Liddell, of Murroes. The Dundee Branch of the E.I.S. have placed on record their deep sense of the loss which the Branch has sustained in the death of Mr. William F. Liddell, Schoolmaster of Murroes, who had for over twenty years taken an active and intelligent interest in promoting its welfare, endeavouring to improve the position of teacher and pupil alike, and to place education on broad and intelligent lines, and whose personal qualities had endeared him to all with whom he came in contact.

NEW WORKS ON PEDAGOGY.

CAMBRIDGE UNIVERSITY PRESS.

Chapters on the Aims and Practice of Teaching, by Frederic Spencer, M.A., Ph.D. When we say that Dr. Spencer's remarks on the 'aims and practice' call to mind Dr. Fitch's 'Lectures on Teaching' we shall have awarded to book and writer a high meed of praise, which is exactly what we desire to do, for thoroughness is the key-note thereof from start to finish. 'In brief, Sir, study what you most affect' is the quotation from the 'Taming of the Shrew' which Dr. Spencer leads off with, and he certainly, in the body of his work, shows how this may be done with respect to the greater number of the subjects included within the curriculum of a higher grade or secondary school. The various writers on the several subjects have well carried out the general idea put forward by its editor, and, as a mere perusal of their names establishes, their qualifications for accomplishing this to an eminent degree are unquestioned. The twelve chapters are as follows:—Greek, Latin, French and German, English, History, Geography, Algebra, Geometry, Physical Science, Chemistry, Botany, Physiology. To those who, like ourselves, are ever looking forward to the good time when all English teachers will be well equipped for performing their work in a manner commensurate with its vital importance Dr. Spencer's book comes as an unquestioned boon. It has our unqualified approval and recommendion.

HEATH'S PEDAGOGICAL LIBRARY.

Messrs. Isbister and Co., the London agents for the eminent Bostonian firm which is so intimately connected with the advance of pedagogy, send us four books, with three of which we are greatly pleased, but of one we cannot say much in the way of appreciation. This is **Child Observations,** by Miss Ellen M. Haskell, who collates twelve hundred odd examples of imitation in children. This is proceding on 'true Baconian principles,' and collecting facts without any theory on a wholesale scale, in a way that would not commend itself to Darwin, Miss Haskell's quotation from the writings of the father of evolution notwithstanding. It has never been difficult in lectures on school method to get from the students themselves innumerable instances of imitation in children, and if there is one general truth which the most unobservant of men in the street would accept without cavil it is that children are imitative. Wherefore we opine that the great industry displayed by Miss Haskell would have been better employed in proceeding from the instances to the principles which they illustrate rather than in heaping Pelion on Ossa in respect to imitation in children. The most valuable part of the book to our thinking is the introduction, which partly explains Miss Haskell's position, but we cannot believe that there is any 'dangerous tendency to seek overmuch and prematurely the formulation of generalisations and principles' in respect to this question of imitation, where there is no fear of *ex uno disce omnes* leading to generalisation from narrow experience, for surely we have the *omnes* without Miss Haskell's monumental collection of instances of the occurrence of this phenomenon, as Mill would put it.

Number and its Algebra, by Arthur Lefevre, C.E. This book is, in the words of its author, 'introductory to a collegiate course in Algebra,' and most potently would it tell in the direction of mathematical soundness were it taken in such connection, for Mr. Lefevre is not only a sound mathematician but he is also a lucid exponent of this most eminent of deductive sciences. To the elementary student as well as to the experienced mathematician this little book should commend itself as a thought provoker. Wherefore we heartily wish it a good circulation amongst English men of numbers.

Studies in Historical Method, by Miss May Sheldon Barnes. Bearing in mind what Herbert Spencer has to say respecting the teaching of history in English schools, as well as what has been said on the same subject by Quick and Fitch, to say nothing of men of lesser note, we turned to Miss Barnes' book with lively feelings of curiosity. The key-note to the *ipse-dixits* of the authoress is to be found on the title page, where Miss Barnes approvingly quotes the saying of Droysen that 'The essence of historical method is understanding by means of investigation.' With this dictum no one will have the temerity to quarrel, and it is, perhaps, the highest praise that can be awarded to the authoress of this inspiring little book to say that she does not change her key from cover to cover. Every teacher who has the least interest in the teaching of History should apply himself to this volume of the Pedagogical Library without loss of time.

Comenius School of Infancy, by Will. S. Monroe. Historical pedagogy owes a great debt of gratitude to both author and translator for putting on the market this interesting translation of one of the divisions of the treatise on school teaching for which the scholastic world will ever be indebted to the great Komensky, whom we are learning to reverence more and more every day, as a belief in the existence of principles of teaching comes home to us with more force. The editor has allowed the book to retain much of its old-time quaintness, and he has acted wisely in so doing. He has further added an introduction and some notes, which show how well he knows his Comenius, and how intelligently he appreciates him. The book should find a place in every teacher's tool-chest.

Educational Essays, published by the Jena Seminar Members. In the September number of this paper there appeared an account of the work of Dr. Rein at the Pedagogical Seminar at Jena. In order to commemorate the tenth anniversary of Dr. Rein's work as Professor of Pedagogy at the Jena University a volume of essays bearing on educational subjects has been published. These essays are written by old members of the Pedagogical Seminar who are working out Herbart's educational system in various parts of the world. Germany is naturally well represented. Dr. Maennel, of Halle, contributes a powerful article on the reform of school reading books, and Dr. Lietz compares the educational value of the religion of Jesus with that of doctrine and dogma. Rektor Scholz, of Blankenhain, contributes a psychological article, and Herr Bar, of Weimar, writes of the Christian Socialism of Pestalozzi. Dr. Van Liew contributes an interesting article on the influence of Herbart on American education, and Dr. Findlay, of London, considers the study of Herbart in England.

The influence of Herbart in schools in Servia and Bulgaria is discussed by Herr Protitsch and Dr. Petkoff. One lady contributes an article to this interesting collection—Miss Dodd, of Manchester. She studied pedagogy at Jena in 1895-6, and she writes of the day training colleges in England and their connection with the Universities.

Dr. Rein began his work in Jena ten years ago with eleven students, and during the last year the students numbered 80. The students came from all parts of Europe and America. Two or three ladies have been admitted during the last two years, and they found life in a German pedagogical seminar interesting if somewhat eccentric.

CLASS LESSONS IN DOMESTIC ECONOMY.

BY ETHEL R. LUSH.

Author of 'Chats with Children on Domestic Economy,' Head Mistress of the Ipswich Higher Grade Girls' School, and Organising Mistress to the Ipswich School Board.

Lesson IX.

STANDARD IV.

CLASSIFICATION OF FOOD: MILK, EGGS, AND FISH.

[*Apparatus required.*—Salt and water, a fresh egg, a stale egg, pictures of different kinds of fish, and various methods of fishing.]

You heard in our last lesson that milk and eggs are both nitrogenous foods.

To-day we will consider these articles of diet more closely.

Let us turn our attention first to this beaker of milk. There is a thick cream on the top which I remove and put into another glass. You are aware that cream is the fatty constituent of milk. Now I add a little vinegar to the skim milk and immediately a clot is formed which contains the food substance, casein.

In order to separate the curd from the whey or liquid portion we may filter the clotted milk through filter-paper. Watch how it is done. Here is a circular piece of specially-prepared paper which will only allow the liquid portion of milk to pass through. I fold the paper first into two, forming semicircles, and then into four, after which it is opened out and a funnel formed by taking three thicknesses of paper on one side and one on the other. This paper funnel is fitted into a glass one which I hold over a jar. On pouring the milk carefully through the funnel we find that a clear liquid—whey—has passed through and the solid clot of milk is left on the filter paper. We have now divided milk into three parts—cream, curd or casein, and whey. Whey consists of water which has dissolved in it an especial kind of sugar known as lactose or sugar of milk, also various mineral salts, of which common salt, salts of potash, magnesia, iron and lime are the chief. Some of these salts, more especially lime salts, are found mixed with the curd.

Looking back we find that milk is made up of the following substances :—

(*a*) Casein, a nitrogenous substance.
(*b*) Cream, a fat.
(*c*) Lactose, a carbohydrate.
(*d*) Water.
(*e*) Mineral salts.

Thus we see that every class of food is represented, and what is of equal importance the various constituents are united in the proper proportion to satisfy the requirements of a growing body. For this reason milk is called a *perfect food*, and is given to infants as their sole article of diet for the first eight or nine months of their life.

Milk is suited to infants for other reasons—it needs no mastication, and it is easily digested by them.

Sometimes children are brought up on cow's milk instead of human milk, and as cow's milk contains more casein and less sugar than human milk, it must be prepared by adding water and sugar, thus causing it to resemble human milk more closely. Lime-water is frequently added, too, when it is found necessary to strengthen the bones of an infant.

In dealing with milk, excessive caution is needed, as it readily absorbs noxious gases, such as those from drains and sewers ; or it may become tainted with impure water. When such contamination has taken place, diseases, such as typhoid fever and diarrhœa, frequently result. Then, too, milk very readily absorbs the germs of infectious diseases and carries the infection from place to place. Whooping cough, typhoid fever and scarlet fever have been repeatedly traced to this cause.

We must also remember that milk quickly turns sour, especially in warm weather, and in that condition will produce acute diarrhœa in children.

For all these reasons it is wise to boil milk before it is taken as food, for boiling removes all danger of infection by destroying the disease germs, and also prevents the milk from turning sour very quickly.

Milk should be put into scrupulously clean vessels and kept covered up. To assist cleanliness it is best to use wide-mouthed milk jugs that will admit the hand.

We next consider *eggs*, which, after milk, are the nearest approach to a perfect food.

Eggs, as you know, consist of three parts, the shell, the white, and the yolk. The shell is full of tiny holes or pores, and is composed almost entirely of lime. The white is a colourless, sticky, transparent substance before it is cooked, and an opaque white solid afterwards. It is almost pure albumen.

The yolk is an oil mixed with some nitrogenous material and water.

If we consider an egg to be made up of one hundred parts, seventy of these parts would be water, about fourteen albumen, eleven oil and fat, and the remaining five mineral salts and membranes. The salts of the egg are chiefly contained in the shell, and for this reason we invariably eat common salt with an egg. Eggs, although practically a complete food, as is proved by the fact that the young chicken derives all its support from the egg until it is hatched, are deficient in carbon and contain an excess of nitrogenous food. For this reason they are always eaten with foods rich in carbon such as bread and butter, ham, bacon, etc.

Eggs if lightly cooked are very digestible, and if beaten up raw and mixed with milk or brandy they form a very nourishing article of diet for invalids. Hard-boiled eggs are exceedingly indigestible.

When an egg is kept for a long time it loses weight and decomposes. This is because the water of the egg evaporates through the porous shell and air enters to take its place. Bad eggs can be easily detected in various ways.

Perhaps the simplest method is to hold the egg up to the light ; if it appears fairly clear it is good, but if it be cloudy or spotty, it is stale.

The safest test, however, is this :—Into a glass jar I put a pint of water, adding to it one ounce of salt, thus making a brine solution. I next drop an egg into the jar, it sinks at once, and I know it by this to be fresh. A second egg is dropped into the jar and floats, thereby proving that it is stale.

Eggs are eaten in such quantities by the English that the home produce is not sufficient to supply the demand, and large numbers of foreign eggs are imported from France, Belgium, Denmark, Germany and Ireland. It is, of course, essential that they be carefully packed for transit, and in some cases they must be preserved so that they may be fit for food when they reach us.

Any method whereby the pores of the shell are stopped up will serve to keep eggs from turning bad. A good way is to smear the shell over with lard or butter ; other ways are to keep them in a mixture of lime and water, or in a brine solution. Sometimes eggs are packed in bran, or in dry powdered salt. Eggs differ in flavour according to the bird and its food ; thus the eggs of birds feeding on fish are unpleasant because of their fishy taste. Those that we commonly use are the eggs of the hen, because of their delicate flavour. A goose's or a duck's egg is stronger in flavour than a hen's egg, and is also richer in fat.

The egg of a turkey is rich, and that of the plover has a very delicate flavour which makes it a much-prized article of food.

Fish is an important article of food, and contains in fair proportions the nitrogenous substances of fibrin, albumen, and gelatine. It is, however, very watery, and this renders it less nutritious, weight for weight, than butcher's meat. Fish also contains phosphorus (in the form of phosphates) which is a valuable brain and nerve food. Some kinds of fish are very digestible, and this, and their delicate flavour, makes them useful articles of diet for invalids.

Considered solely as a food, fish may be divided into two classes. Those that have the fat stored up in the liver and the

flesh free from fat, are known as *white fish;* those that have their fat distributed all over the body are called *oily fish*. Cod, ling, plaice, halibut, whiting, sole, and haddock are examples of the former class. Salmon, eel, mackerel, sprat, herring, and pilchard are included among oily fish.

White fish possess the advantages of being light and digestible, and of having a very delicate flavour. Oily fish, although not so digestible, are more nutritious than white fish, owing to the large amount of fat they contain.

Shell fish such as lobsters, crabs, crayfish, shrimps, and prawns are considered indigestible, and have been known to produce an irritating rash on the skin. Owing to their rich flavour, however, they form very popular articles of diet.

Oysters are generally eaten raw, and in this form are almost self-digesting. They are also nutritious, and for these reasons are popular as food for invalids. Cooking destroys the self-digesting ferment in the oyster and converts it into a leathery indigestible mass.

Mussels, although more nutritious than oysters, are less digestible, and in some cases produce unpleasant symptoms, which fact causes them to be somewhat avoided.

You will be surprised to hear that herrings are the most valuable of fish to the nation. They are caught in great abundance and provide an ever-ready source of cheap and good food. They may be eaten fresh, as they are caught, or may be cured by being salted, when they are called 'bloaters,' or smoke-dried, as 'red herrings,' or split open and smoked to form 'kippers.'

After herrings, *mackerel* rank next in abundance. This fish should be eaten as fresh as possible, as it soon decays. You may tell fresh mackerel by the brightness of its colours and the redness of its gills.

Cod and *haddock* are both cheap and plentiful; the former is generally eaten fresh, but the latter is also split open and smoked.

Salmon is the most prized of all fish. Its delicate pink flesh of delicious flavour makes it highly popular, but its expense places it beyond the reach of many.

Of the many kinds of flat fish *sole* and *turbot* are the most expensive.

It is interesting to note the various ways in which fish are caught.

Herrings, mackerel, and pilchards are caught in *drift-nets* which are let down into the sea at night, and as the shoals of fish come upon the nets they become entangled in the meshes and are drawn in at dawn—a silvery, shining, slippery mass.

Flat fish, such as turbot, brill, and plaice, are taken from sandbanks at the bottom of the sea by means of huge bag-like nets called *trawls* which are trailed along the bottom of the sea by boats known as trawlers.

Cod and haddock are caught singly by hooks attached at short distances to a line which is let out from a smack and kept floating by means of buoys and cork floats.

Oysters, mussels, periwinkles, and escallops are obtained by *dredging*. A net, something like a trawl, is dragged along the bottom of the sea by a smack, and in this way the shell-fish are caught.

Salmon are taken near the shore and in rapid rivers when the fish go up to spawn. They may be taken in nets or they may be caught with rod and line.

SUMMARY.

Composition of Cow's Milk.—Water 87 per cent., casein 3·4 per cent., sugar 5 per cent., fat 3·8 per cent., salts 0·8 per cent.

Milk is called a *perfect food* because every class of food is united in it in the proper proportions to satisfy the requirements of the growing body.

Milk is suited to infants (*a*) because it needs no mastication; (*b*) it is suited to their powers of digestion.

Milk should be boiled before use (*a*) to ensure against disease germs it may contain; (*b*) to keep it from turning sour.

Composition of a Hen's Egg.—Water 70 per cent., albumen 14 per cent., oil and fat 11 per cent., mineral salts 5 per cent.

Tests for Freshness of Eggs.—(*a*) Hold the egg to the light, if clear it is fresh, if cloudy stale. (*b*) Make a brine solution from 1 oz. salt and 1 pint water; fresh eggs will sink in it, stale eggs float.

To Preserve Eggs.—(*a*) Smear the shells with fat; (*b*) pack them in lime and water, bran, or pounded salt.

Fish.—*White fish* have the oil stored up in the liver as cod, haddock, etc.; *oily fish* have the fat distributed all over the body, as herrings, eels, etc.

White fish are digestible and delicate in flavour, oily fish are less digestible but more nutritious.

Shell-fish are difficult of digestion, excepting oysters.

Fish are caught by means of trawls, drift-nets, hooks and lines, etc.

NOTES OF A LESSON ON SIMPLE LEAVES.

BY PROFESSOR J. R. GREEN, SC.D., F.R.S.,
Examiner in Botany to the University of London, Late Examiner in Botany to the University of Cambridge.

SEE SUPPLEMENT PRESENTED WITH THIS NUMBER.

SPECIMENS REQUIRED.

THERE is a great variety in simple leaves, but specimens of the forms figured in the accompanying sheet may easily be found by country children in fields and hedgerows or in their gardens. In the case of town children it may be necessary to get living specimens from the nurseryman. The leaves of grasses and young corn are *linear* (Fig. 1); the leaves of the Juniper *acicular* or *acerose* (Fig. 2); the leaves of the Wallflower and Sweet William *lanceolate* (Fig. 3); the leaves of the Lily of the Valley *elliptical* (Fig. 4); the leaves of the Pansy and Laurel *oblong* (Fig. 5); the leaves of the Lilac *ovate* (Fig. 6); the leaves of the Nasturtium and Sundew *orbicular* (Fig. 7); the leaves of the white Water Lily and Sweet Violet *cordate* (Fig. 8); the leaves of the Ground Ivy and Mallow *reniform* (Fig. 9); the leaves of the Primrose and Daisy *spathulate* (Fig. 10); the leaves of the Arrowhead *sagittate* (Fig. 11); the leaves of the Sheep's Sorrel *hastate* (Fig. 12); the leaves of Saxifrage *cuneate* (Fig. 13); the leaves of the common Berbery *obovate* (Fig. 14); the leaves of the Currant *palmate* (Fig. 16); the leaves of the Honeysuckle *connate* (Fig. 17).

OUTLINE OF LESSON.

I. WHAT IS A LEAF?—A leaf may be defined as an appendage borne upon an axis, from which it differs in its structure and organisation. This definition will include all the kinds of leaves known to exist, viz. foliage leaves, the leaves of the flower, which are called *sepals*, *petals*, *stamens*, and *carpels*; also the various sorts of scales or *cataphyllary* leaves. In this lesson we are only concerned with the first of these classes, the green leaves of the plant, or the so-called *foliage* leaves. Like the stem itself, the outgrowth or axis of the leaf is capable of branching. The part of the stem or branch from which a leaf arises is called a *node*, and the space between two nodes is called an *internode*. The portion of the leaf next the stem is its base, the opposite extremity its apex, and the lines connecting the base and apex the *margins*. The leaf being commonly of a flattened nature has usually only two surfaces. The flattened form is due to the axis putting out a winged expansion.

II. DURATION AND FALL OF THE LEAF.—The leaf varies in the length of its duration. When it falls off very shortly after its appearance it is said to be *fugacious* or *caducous* (*e.g.* calyx leaves of the Poppy). If it lasts throughout the season in which it is developed it is called *deciduous* or *annual*. If it lasts longer than a single season, or until new leaves are developed, so that the plant is never without leaves, it is called *persistent*, *evergreen*, or *perennial*.

III. THE PARTS OF THE LEAF.—The leaf generally takes the form of a flattened expansion, and three regions may be distinguished in it, the *leaf-base* including that region which is attached to the stem, the *lamina* or usually flattened terminal portion, generally called the leaf proper, and the intermediate portion known as the leaf-stalk or *petiole*. Where two leaves arranged in an opposite manner have their bases winged, and the wings united round the stem, as in the Honeysuckle (Fig. 17), they are said to be *connate*. The petiole is sometimes absent, the leaf is then said to be *sessile*. The leaf-blade shows a great variety of form. It is best regarded as a branch system rather than a single outgrowth. It usually consists of an axis with several branches, which may or may not become winged. We get what is called a compound leaf when the axis of the leaf-blade remains cylindrical and the branches immediately given off from it become separately winged. We have then a number of small winged expansions, each attached to the axis, and each apparently independent. In a simple leaf, though the axis and its branches may both be winged, the wings of both are

usually more or less united, giving rise to the appearance of a single, much-divided blade, as in the leaves of the Ivy and Currant (Figs. 15, 16). Where the branching is *cymose*, *i.e.*, when the main axis stops growing and lateral branches are developed behind it, we have *palmate* leaves as in the Currant (Fig. 16). Generally the branches of the leaf-blade lie all in one plane, so that the leaf is flattened with its face towards the stem. In a peculiar variety of the palmate form known as the *peltate* leaf, the leaf-stalk, however, is apparently attached to the centre of the leaf-blade, the plane of which is thus almost at a right angle to the direction of the stalk. This is due to the fact that the younger branches grow out in front of the petiole, instead of in the usual lateral plane, and their wings being coherent with each other, the leaf-stalk becomes apparently attached to the middle of the lamina. A good example is seen in the *orbicular* leaf of the Garden Nasturtium (Fig. 7).

IV. THE VENATION OF THE LEAF.—The strands of woody tissue which traverse the leaf-blade are called *veins*, and their arrangement constitutes the *venation* of the leaf. A leaf may be parallel-veined (*e.g.* Fig. 1), the main veins proceeding in a somewhat parallel direction from the base to the apex of the leaf-blade, or it may be *net-veined* (*e.g.* Figs. 3, 7, 16). Net-veined leaves are *feather-veined* or *palmately-veined*. In the leaves of the Pansy and Laurel (Fig. 5) the mid-rib gives off lateral veins which proceed at once to the margin. In the leaves, for example, of the Primrose and Daisy (Fig. 10), the mid-rib gives off branches from its sides, which proceed at first towards the margins, and then curve towards the apex, terminating finally within the margins with which they are connected by small veins. These are called feather-veined, because the arrangement resembles that of a feather. A leaf is said to be palmately-veined (Figs. 7, 9, 15, 16) when it possesses two or more ribs that arise from at or near the base of the lamina, and diverge from one another towards its margins, and are connected by branching veins.

V. SIMPLE LEAVES.—The various modifications of form which leaves present may be considered under five heads:—Margins, Incision, Apex, General Outline, Form.

(i.) *Margins.*—The edge of a leaf is its margin. It may be entire, perfectly even (Fig. 1), or *serrate* (Figs. 2, 6), with sharp indentations like the teeth of a saw, all pointing forwards; or *dentate* (Fig. 10), with sharp teeth projecting almost or quite at right angles to the margin; or *crenate*, with rounded teeth (Figs. 8, 9).

(ii.) *Incision.*—When the margins of the leaves are more deeply divided than the cases we have considered, they are called lobes (Figs. 15, 16).

(iii.) *The Apex* of the leaf figured in Figs. 4, 6, is sharp-pointed or *acute*. In Figs. 3 and 8 it is tapering or *acuminate*. In Figs. 5 and 14 it is blunt or *obtuse*.

(iv.) *General Outline or Figure.*—With regard to their configuration most leaves are *equal*, the leaf being symmetrical and of some regular figure. Occasionally, as in the Begonia, the wing is more developed on one side than the other, and the leaf is called *oblique*. The leaves of grasses and corn (Fig. 1) are *linear*, *i.e.*, the leaf-blade is nearly of the same breadth at the base as at the apex, it is narrow, and the margins are parallel. The leaf of the Juniper (Fig. 2) is *acerose*, *i.e.*, it is a linear leaf terminating in a sharp rigid point like a needle. The leaves of the Wallflower and Sweet William (Fig. 3) are *lanceolate*, *i.e.*, the leaf-blade is broadest at the centre, three or more times as long as broad, and tapers perceptibly from the centre to both base and apex. The leaves of the Lily of the Valley (Fig. 4) are *elliptical* or *oval*, *i.e.*, they are a little longer than broad, of about the same breadth at the base and apex, and slightly acute at these points. The leaves of the Lilac (Fig. 6) are *ovate*, *i.e.*, they are the shape of an egg cut lengthwise. The leaves of the Nasturtium and Sundew (Fig. 7) are *orbicular* or nearly round; the leaves of the White Water-lily and Black Bryony (Fig. 8) *cordate* or heart-shaped; the leaves of the Ground Lily (Fig. 9) *reniform* or kidney-shaped. The leaves of the Primrose and Daisy (Fig. 10) are *spathulate*, *i.e.*, they are oblong, but wider towards the end like a spatula. The leaves of the Arrowhead (Fig. 11) are *sagittate* or arrow-shaped; those of the Sheep's Sorrel (Fig. 12) are *hastate* or halbert-shaped. The *cuneate* leaves of the Saxifrage are wedge-shaped, the leaf-blade being broad at the apex, abruptly pointed, and tapering towards the base. The leaves of the Common Berberry (Fig. 14) are *obovate*, or inversely egg-shaped, the leaf (Fig. 15) is *trilobate*, the main axis being divided into three branches, which have developed simultaneously, and the wings or flat portions of each branch are joined together. The leaves of the flowering Currant (Fig. 16) are *palmate*, *i.e.*, they have about five veins branching simultaneously, like the fingers of the hand.

(v.) *Form.*—This term is applied to the solid configuration of the leaf. Thick or succulent leaves may assume some regular geometrical form, as pyramidal, prismatic, or approach in form to some well-known objects, and be termed *ensiform* or sword-shaped, etc.

There are often two little foliar outgrowths at the place where the leaf joins the stem. These are called *stipules*. They are branches of the base of the leaf.

INTERNATIONAL CORRESPONDENCE FOR TEACHERS.

LEARNING LANGUAGES BY LETTER WRITING.

THE large number of our readers who have shown their interest in the new scheme of International Correspondence set forth in the March and April numbers of the PRACTICAL TEACHER will be glad to learn that very decided progress has been made in the arrangements for bringing the plan into actual operation. Two lists, including two hundred names received at our office, have been forwarded through the editor of the *Review of Reviews* to Messrs. Armand Colin and Co., publishers of the *Revue Universitaire*. Some of these have now been paired with French correspondents, from whom they may shortly expect to receive the first letter written in French.

In the pages of a French weekly scholastic journal, publised also by Messrs. Armand Colin and Co., under the title of *le Volume*, an editorial article appeared during the latter part of March describing M. Mieille's scheme and our proposed extension of the idea so as to form a special department for teachers. This development was dwelt on with most hearty approval, and an appeal was made to French teachers to send in their names. The final paragraph contains interesting matter so well put that we venture to quote it. After describing the active part taken by the *Review of Reviews*, the writer continues:—

> 'Un autre journal anglais, le PRACTICAL TEACHER (*le Maître pratique*, un titre bien anglais, par parenthèse) a fait appel aux instituteurs anglais, aux élèves et aux maîtres des cours d'adultes, les invitant à s'inscrire eux mêmes sur la liste des candidats à la correspondance franco-anglaise. Cet appel a été entendu et les candidats se sont fait inscrire en foule. Les lecteurs du *Volume* sont donc assurés de ne pas manquer de correspondants. Qu'ils repondent, eux aussi, à notre appel: Instituteurs, institutrices, élèves de nos écoles normales, de nos écoles primaires supérieures, de nos cours complémentaires et de nos cours d'adultes seront bienvenus sur nos listes. Nous n'excluons personne, mais il va sans dire que *ceux-là seuls auront profit à s'inscrire qui sont déjà assez avancés pour écrire une lettre intéressante et intelligible.* Pour correspondre comme pour causer il faut être en état de se faire comprendre: le profit serait nul pour deux interlocuteurs qui ne s'entendraient pas, et le *Volume* aurait mauvaise grâce à présenter à nos amis d'Angleterre des correspondants qui ne sauraient que balbutier.'

It has now been arranged by the publishers that the lists of names of teachers as they are paired for correspondence shall appear in the pages of *le Volume*, and in the number bearing date April 10th a first list is printed, which contains twenty-five names on each side. The *Revue Universitaire* continues the publication of lists of scholars, and the number issued for March contains nearly 300 names on each side. The lists are headed in both journals by an important notice in almost identical terms; and for the benefit of our readers we transcribe that which appears in *le Volume*.

> 'Les Français doivent écrire les premiers.
>
> 'Leur première lettre sera écrite en français, la seconde en anglais, et ainsi de suite. Les Anglais leur répondront la première fois dans leur langue, la deuxième fois en français.
>
> 'Deux lettres par mois doivent suffire.
>
> 'AVIS IMPORTANT.—*Le Volume* etant seul à publier les noms des correspondants, nous recommandons instamment aux Français d'écrire très lisiblement en tête de leurs lettres, leur nom, leur prénom, leur adresse.
>
> 'Nous leur conseillons de demander à leurs correspondants de leur retourner, corrigées, les lettres qu'ils écriront en anglais.'

M. Mieille, the originator of the scheme, writes to us with characteristic enthusiasm of the arrangements already made for carrying his admirable proposal into operation, and of others now in progress. He forwards us a copy of a local scholastic publication, *L'Education laïque, journal de l'enseignement primaire*, in which appears a vigorously written

appeal to his colleagues to enter into the lists, and do what they can to promote this new method of international exchange.

In a letter to ourselves M. Mieille says :—

> Some of the pupil-teachers of both Training Colleges here (at Draguignan) have already got masters or mistresses for their correspondents. They are delighted with the idea of the correspondence leading some day to reciprocal visits. Indeed I hope we shall begin that *personal exchange* at Easter. A young countryman of yours, the son of a head-master of a school, will probably come over and spend his Easter holidays in the family of one of my pupil-teachers. Is not that the beginning of 'the good things to come'?

In another portion of this issue we give a very interesting article by M. Mieillie on the work at Draguignan Training College for Teachers. The group of assistant masters (*Brevet inférieur*) reproduced has been sent by M. Miellle, who writes : 'I thought your readers might like the presentation, however imperfect, of several French colleagues who will probably be future correspondents.' We certainly need no assurance that the author of the scheme of International Correspondence will use his best endeavours to promote its success.

Some of the letters we have received from teachers applying to be placed on our lists are very interesting. One writing from Stronsay, Orkney, says: 'I hail with much pleasure the proposal contained in the March number of your paper, entitled, "International Correspondence for Teachers."' After asking us to find a French teacher willing to correspond with him, he adds somewhat slily : 'I should enter into the work with more zest if I could be paired with a young lady teacher.' We fear we cannot oblige him in that particular way. Our desire is to benefit teachers as such, and to promote an educational movement ; but we cannot enter into responsibilities of an altogether different kind. Another letter comes from an English governess living in Roumania, who kindly says she thinks the scheme a very excellent one, and she will be thankful to avail herself of it to get practice in French letter-writing.

The enterprising editor of the *Review of Reviews*, in the current number of that admirable periodical, contemplates a further development of the correspondence scheme, which would establish a very extensive general International Correspondence Bureau. His acceptance of M. Mieille's innocent proposal to give some space to recommend the scheme for an interchange of letters between the students of French and English in their respective countries seems to have 'opened a door into a realm of usefulness which hitherto no systematic attempt has been made to enter.' After noting that over 1,300 scholars have already been put in communication with each other, 650 in each country, he says there are still 600 French boys clamouring for English correspondents of the same sex, and 250 English girls remain unmated with French correspondents. Efforts are being made on both sides to remove the present discrepancies.

We shall be very glad if any of our readers can assist Mr. Stead and M. Armand Colin by supplying the names of boys who would like to take advantage of the scheme. 'The French office,' we are told, 'is so overflowing with lists of boys, that soon there will be no room for its human occupants.'

And now for Mr. Stead's new step forward. He suggests a scheme for adult students, professional men, men in business, and others who would like to exchange ideas with foreigners engaged in similar pursuits to their own. The suitable pairing of correspondents in accordance with this suggestion, so that English doctor for instance might be placed in communication with French doctor, English solicitor with French *avocat* or *notaire*, and so on, would of course involve considerable responsibility and much preliminary work. Of the great advantages that might result on both sides there can be no doubt. Mr. Stead, recognising the value of this extension of the scheme, and also the extra trouble and cost which its efficient working out would entail, proposes to insert in the next number of his Review the names and addresses of any readers who may send to him and specify the language in which they wish to correspond, and the subject in which they are specially interested, together with one shilling's worth of stamps to cover printing, postage, correspondence, etc. He will also appeal to readers of the Review throughout Europe, and so try to find suitable correspondents, and endeavour to make the best disposition of the applications.

With regard to this extension of the International Correspondence scheme, we may say that it will not in any way interfere with our own arrangements. We wish for it a complete success, but its scope is altogether outside our own more compact and manageable plan with its more definite aim. We have mentioned it because it is certainly interesting, and also because some of our readers who read also the *Review of Reviews* might suppose that the modifications suggested might affect our own clients. Considering the vast possibilities of Mr. Stead's scheme, we think he is quite justified in requiring a fee to recoup his outlay.

Our object, however, is entirely educational. Our *clientèle* is the general body of teachers. Our wish is to assist them in acquiring facility in the use of the French language. Our work is limited to setting the scheme in operation for their benefit. While we have recognised from the beginning, and have found out by our recent experience, that this work involves some trouble and anxiety, we have no need nor intention of charging any fee. For an all-sufficient return for our efforts in the matter we look only to the educational good we may help to accomplish, and the kindly appreciation we are sure of receiving from those who share in that good.

We have now only to ask from candidates who are not yet put in communication with French colleagues a little more patience, and to promise that it shall not be tried more than is absolutely necessary.

OUR FRONT PAGE PORTRAIT ILLUSTRATION.

MONSIEUR BLONDIAU.

(*The Belgian Delegate to the Swansea Conference of the N. U. T.*)

MONSIEUR BLONDIAU, délégué de la fédération belge au Congrès de Brighton en 1896 et á celui de Swansea en 1897, est instituteur communal à Liège depuis plus de 20 ans. Il est membre du comité général de la fédération belge, secrétaire-trésorier de la section provinciale de Liège, membre du comité du cercle 'Les Anciens Normaliens' et de la Société le 'Travail Manuel.' C'est un des membres les plus dévoués, les plus actifs, les plus vaillants de la fédération belge ; sa compétence sur toutes les questions d'enseignement est connue et appréciée de tous ses collègues ; son energie et sa franchise sont devenues proverbiales. Toujours sur la brêche, il s'est fait un des champions les plus acharnés des revendications de la fédération belge. Il lutte sans relâche et sans défaillance en attendant des temps meilleurs, pour le triomphe des *desiderata* du corps enseignant. Aussi prend- il chaque année une large part aux Congrès belges.

Signe particulier : Il aime tout particulièrement l'Angleterre, dont il admire les institutions et l'esprit de corporation.

ENTIRELY NEW OBJECT LESSON SUPPLEMENTS, BEAUTIFULLY PRINTED IN COLOURS, will be presented with many of our issues during 1897.

☞ **WILL OUR READERS KINDLY MAKE THIS KNOWN TO THEIR PROFESSIONAL FRIENDS?**

OUR ART SECTION.

BY J. VAUGHAN,
Art Master, and Organising Teacher of Manual Training, School Board for London.

INDUSTRIAL DRAWING IN ELEMENTARY SCHOOLS.

III.

In order to make somewhat more rapid progress with the elementary portion of the scheme which I am endeavouring to place before you, the illustrations to the present article are shown to half scale. Indeed, I wish you to treat them as illustrations only. The size that these—or other similar figures you may devise for yourselves—should be actually drawn by the scholar, depends entirely upon the capacity of the children of a particular class. Generally speaking, the larger drawings are made—within reason—the better training it gives. It will doubtless be seen that we are gradually lengthening the lines required to be drawn. Figs. 5 and 7, for example, introduce lines four inches long. Further, several of these exercises necessitate the division of lines into *three* equal parts. In Fig. 6 this division into thirds comes automatically from the squared paper. Let the children study this carefully, and then follow up the exercise by drawing Fig. 12 on plain paper, because the shaded portion representing the leather-bound corners extends just one-third along the upper and lower edges of the book. Similar distances are required in Fig. 14, where the handle of the box occupies just one-third of the top, and the lid just a third of the depth. Again, in Fig. 15 the level portion of the handle of the pen tray is one-third of the greatest length, and in Fig. 17 the top of the wine glass is two-thirds the total length, *i.e.*, one-third on either side of the axis—and the shaded portion extends two-thirds of the distance up the glass.

In actual practice do not always point out these proportions before allowing the children an opportunity of judging the spaces for themselves. Take Fig. 14 for example. Make a sketch of this on the blackboard, according to the proportions shown here. Let the children draw it without any instruction. Now go carefully through the proportions with them, and see how many have noticed that the handle extended over a third of the entire top, and that the lid was a third of the depth. Such definite tests are of the greatest assistance in bringing home to the children the errors they have made. Have a second sketch made below the first, after the mistakes have been noted, and compare the two drawings.

I need scarcely point out that the converse of this method must also be employed. You must take a drawing and build it up step by step, allowing the children to judge carefully, under your direction, the length and position of every line, so that when the drawing is complete its proportions will be accurate. Remember that instruction is a vital principle in education, and you cannot always with advantage throw the children on their own resources; they need some assistance. The tendency nowadays, however, is for the children to have too much done for them, instead of 'teaching them to help themselves,' as Mr. Sharpe expresses it.

In looking at the examples here shown, and those given in the preceding numbers, the reason for the title 'Industrial Drawing' may, perhaps, be more clear. It is difficult to define exactly what the term includes, but perhaps the character of the drawings may give some idea of it. The simple designs, emphasised by shade lines, show at once an 'industrial' leaning. Probably most of the children have seen Figs. 1, 3, 4 and 5 worked out in some form or other—tiles, embroidery, linoleum, parquetry, window panes, etc. Indeed, those who have had the opportunity of visiting a museum can scarcely fail to have come across one or other of them, and presently I want to show how these may be worked out in a more concrete form, by being coloured in various ways, or by being produced in other materials, thus introducing *construction* as well as *representation*. Next, it will be noticed that, apart from the designs, the figures all represent objects with which the children are fairly familiar.

The abstract division of lines and angles, and the drawing of parallel lines as such, is omitted, because from my own personal experience I have found that children do not take an interest in this kind of work. They like to make a drawing of something they have seen, and which affords them some pleasure when it is done. To this end is given the dovecot, Fig. 8; the conventional ivy-leaf, Fig. 9; the windmill, Fig. 10; and the church, Fig. 11. Scarcely any of these would be possible for children at the present stage of their career, unless adapted to squared paper. Figs. 12 to 17 follow on similar lines, and it may be possible in all these cases to let the children draw from the actual object, rather than from a blackboard sketch—or at least to let them see the object, even though the teacher also sketched it on the board, as depicted here. The idea that drawing is the representation of real things should be inculcated as early as possible. Even some of the designs may be easily represented in a concrete form. Fig. 3, for example, may be readily produced with a long strip of paper, and Fig. 6 by four squares of paper. I call your attention to Fig. 16, which is what one may call a skeleton representation of a bird's foot. The 'drawing' here is nothing; the idea is to fix graphically on the mind the fact that some birds have three toes in front and one behind, just as I explained last month with reference to the budding twigs. Into the same class I would also place the ivy-leaf, Fig. 9, showing the five lobes. Thus by simple design, by representation of known objects, by expressing facts graphically, we try to lay the foundation for those kinds of drawing which may be of use in after life in so many industrial pursuits. I am quite certain that the present educational value of these exercises is not only as great, but far greater, than that obtained by doing the more routine work.

In the immediate present the aim is rather to train the hand to a free use of the pencil. The method shown in the first paper of joining two points by a single stroke must still be continued. This power to draw a line freely and well is not very quickly acquired, but it is a great factor towards success. By drawing on the squared lines the children gain confidence which is of great use to them when they come to draw directly afterwards on plain paper. Do not trouble yourself much about the *fineness* of the line, but only its *character* and the directness with which it is done.

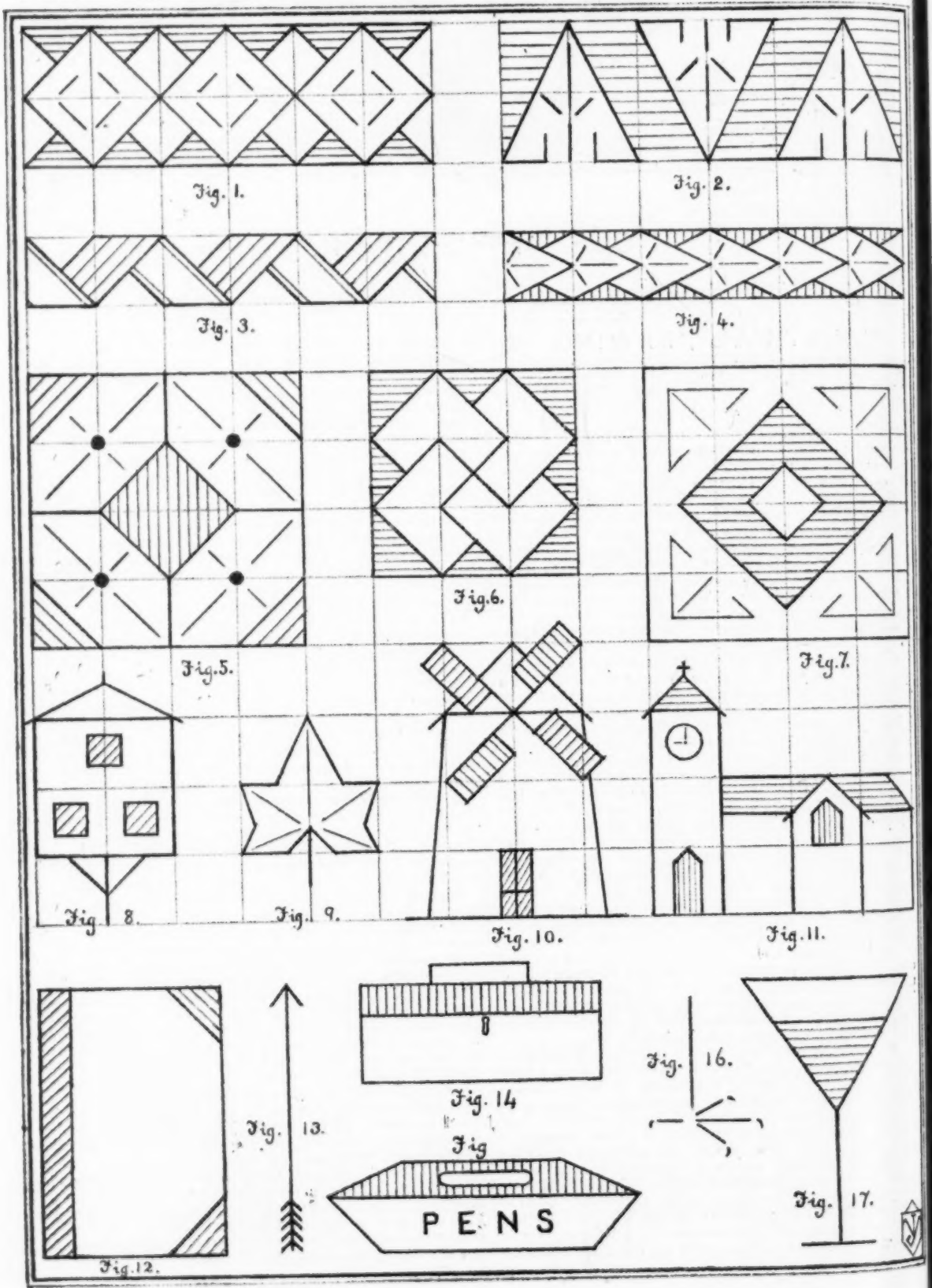
Fig. 1.
Fig. 2.
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Fig. 10.
Fig. 11.
Fig. 12.
Fig. 13.
Fig. 14
Fig. 16.
Fig. 17.
PENS

BRUSH DRAWING.

APPLICATION TO OBJECT LESSONS.

THE present article is somewhat out of the normal course of the scheme of brushwork that I am endeavouring to place before you. It must not be taken as following on naturally after the one given last month; most of the exercises would be too difficult for that. The purpose is to show the close relationship, and the great use that may be made of brush drawing, in connection with certain schemes of object lessons.

The Code of 1897 says: 'It is intended that the instruction in elementary science shall be mainly given by experiment and illustration. If these subjects are taught by definition and verbal description, instead of making the children exercise their own powers of observation, they will be worthless as means of education.' Mr. Rooper, in his 'School and Home Life,' writing of Object Teaching, says: 'In true object teaching, the object must be kept frequently and long under the child's notice, and his memory must be checked by repeated comparison of his mental image with the actual object. Hence drawing—that best external evidence of the inner mental image—or modelling, should be resorted to as early as possible.' 'The trained use of the senses is necessary not only to the man of science, and to the artist, but also to the ordinary artisan, if he is to introduce into his work any original thought or design.' I suppose every teacher will agree with the spirit of these remarks, and I am sure no teacher could read Mr. Rooper's book without both pleasure and profit.

The supplement accompanying this month's number gave me an opportunity of showing how fair skill in brush drawing may be of great service in carrying out these ideas.

Let us suppose you are taking one of the 'C' courses of object lessons as laid down in the Code.

You wish to impress upon the children's minds the various forms of simple leaves illustrated in the supplement presented with this number. The best way of doing this is to have them drawn, and the brush is really the easiest tool of all to draw them with after a little practice. I said at the outset that the first attempts to draw with a brush, after being used to the hard points of pen or pencil, are not usually very successful; but once get used to the flexibility of the tool, and I am quite certain you will agree with me in this matter. Besides, it has the undoubted advantage of making the shape 'solid' instead of merely an outline.

I take it that the various forms would be studied from actual specimens, and the children would thus, from their own observation, find out the points of similarity or difference between the different kinds. It would be a good plan to mount a set of the actual leaves on cardboard, so that they may always be handy for reference, and when the lesson on a particular leaf is given, comparisons can be made with those that have been taught before, both from this sheet of specimens and from the children's own drawings.

Each leaf having been studied separately, and drawn, so that its shape may be well remembered, I now propose to carry the work a step further, and combine the forms so learnt to make simple designs.

It has been proved now beyond doubt that this simple pattern making, in whatever material, is one of the most absorbing occupations of a child's school life. The designs on squared paper, the mats and pricking of the infant school; the pattern work such as I have suggested in the industrial drawing, or that done with coloured papers, with coloured chalks, or with brush, in the senior departments, is alike educational and interesting if pursued on right lines. 'Any work that trains the eye and the hand is in the truest sense educational.'

I have taken the *oblong* type—which Professor Green states is found in the pansy and laurel—to form the first ornamental arrangement, because this may be fairly represented by the simple blob. If, however, the children are able to draw the forms, so much the better; they can then be put in any size that may be required, and may of course be more natural in shape. This form, together with the *cordate* and *elliptical*, I have scarcely drawn upon for the designs shown, because the simple blob, or the double blob, will fairly represent them, and any of the previous examples may be utilised.

Further, some of the forms—as the *orbicular*, *connate*, *palmate*, *trilobate*, etc.—do not lend themselves readily to design, and are therefore omitted.

You would also point out to the children that the leaves here are made rather more regular in form than we should find them in nature, and that we are permitted to use half leaves, as in Figs. 6, 9, and 11. The natural leaves suggest the forms to our minds, but we alter them, within bounds, to suit our purpose.

Fig. 2 is based upon the *lanceolate* type—the wallflower, sweetwilliam, Easter lilies, etc., and may be made most ornamental. The form can be most readily made by putting the point of the brush to the paper, and drawing it gradually in the direction of the stroke, while the whole brush is brought down. It is really a very elongated blob, pointed at both ends. You will notice that other elements are introduced to give a more interesting pattern.

Fig. 3 introduces the *sagittate* or arrowhead-shaped leaf. It is a very ornamental form. Notice that the base is slightly broadened out to fill the triangular space. The arrowhead, cuckoopint, and wild convolvulus are examples of this shape. Fig. 5, with the lanceolate leaves, has just the same geometrical basis, but the lines are not expressed; it is left for the ornament to suggest the triangular form.

Fig. 6 utilises three forms—*reniform*, the marshmallow; *hastate*, sheep's sorrel; and *linear*, as grass, crocus, daffodil, &c. In a pattern of this kind it will be necessary to put in the leading lines with pencil. Few children, or adults either, would be able to draw such forms straight away. This pencil work should not be over done. Just a single suggestive line to give the proportion of the centre leaf, another one for the flowing curve left and right of it, is all that will be necessary. The complete outline should, of course, never be drawn.

Three elements are again used in Fig. 7, and I would suggest here, too, that a single line to mark approximately the position of the linear leaves be drawn with a pencil; the others may be put in direct. A similar method will have to be adopted for many of the other examples. There is really no need to banish the pencil because you are using the brush. You make just such a suggestive sketch as an artist makes who is about to paint a flower or a landscape.

Fig. 9 is based wholly upon the *hastate* type. You will probably see that it does not quite fill the space so completely as many of the examples. Get the children to suggest a filling for the spaces between the leaves, after the manner shown in Fig. 2.

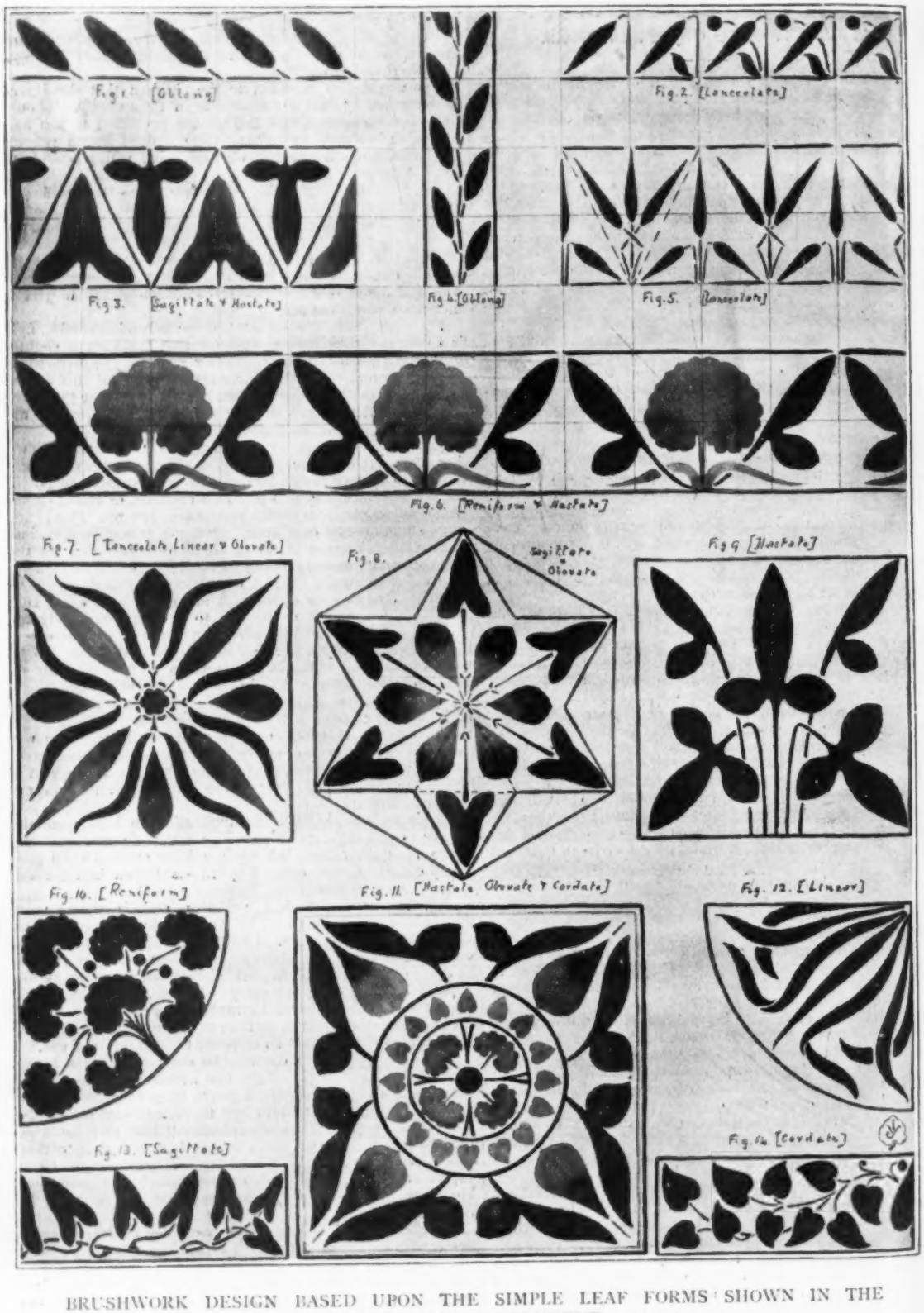
Of all the forms suitable for application to brushwork the *linear* is probably the best. It is just the stroke that the brush naturally makes, but as at a later stage I shall give many examples, one only—Fig. 12—is shown here for the sake of completeness.

Fig. 11 introduces four varieties, and is rather more elaborate than the rest. The circles would, of course, be described with compasses. I have purposely kept the designs as simple as possible. My object is really not to give a course of design, but only to show such simple arrangements as are capable of being done by average children. Figs. 13 and 14 show freer and more natural arrangements of the units; they are really more difficult to do than the symmetrical examples, though the errors are not so palpable to the untrained eye.

When these exercises come to be worked out on a larger scale, and to have all the charm that varied colour can lend to them, they will, without doubt, prove most interesting. We are constantly being told to 'go to Nature,' 'to teach the children to observe.' You must, however, first give them an interest in natural forms, and I believe that some such method that I have here imperfectly suggested—bringing in the forms of leaves and flowers, which children really love, and combining them to form pretty patterns—will be a powerful incentive to this.

It is always to be understood that the children should attempt to make for themselves original combinations from the same elements.

There seems to be some difficulty about obtaining the 'inch squared' paper. Messrs. Arnold of Leeds, Philips and Moffatt and Paige, London, keep this in stock.



BRUSHWORK DESIGN BASED UPON THE SIMPLE LEAF FORMS SHOWN IN THE PLANT LIFE SUPPLEMENT.

Our Tutorial Section.

THE LADY LICENTIATE IN ARTS;

OR,

HOW TO GET THE L.L.A.

In our last issue we put before our readers, simply and concisely, the case for the L.L.A., and we invited letters from lady subscribers who are anxious to read for the L.L.A. course. Up to the present the number of requests for the adoption of this new feature has not been sufficiently great to justify us in setting aside the three pages of space which the new departure would necessitate.

On the other hand, the letters expressing approval and asking for the course have been both too numerous and especially too earnest to permit us to turn aside lightly from the inclusion of an L.L.A. section in our Tutorial Section. We have resolved, then, to put the matter once again to the vote, and to suspend our decision until we do or we do not receive further requests for L.L.A. tuition. So pressing are the demands upon our space that it is imperative for us to proceed with extreme caution in the matter of fresh demands, especially as we wish every word that is allowed to appear in THE PRACTICAL TEACHER to appeal to as many teachers as possible. Hence our present attitude, which simply expresses our desire to please our readers, and to utilise to the utmost every page of our journal.

In addition to what was said last month, we may say that this corner of the Tutorial Section should appeal to all teachers alike, and not merely to candidates for the L.L.A. title and diploma, since the books set for study are educational classics, ignorance of which should be a reproach to a qualified teacher. This will appear plainer if we enumerate the four books that we should select from the seven named in the syllabus for study. (*a*) *Matthew Arnold's Higher Schools and Universities in Germany.* This book is brimful of information as to the one phase of education, viz., secondary, in which we are most woefully behind, and in which Germany is sagaciously ahead. To say that Matthew Arnold wrote the book is sufficient to commend it to perusal, even though its subject were not of surpassing interest in itself. (*b*) *Herbert Spencer on Education.* Since the world began no book on education has received or deserved to receive more attention than the little book which our greatest of living philosophers contributed to pedagogic lore. That there should be one English teacher unacquainted with this classic is certainly not in accordance with the fitness of things, since it is read with avidity in all tongues, and regarded as simply indispensable in the United States. We need, then, say nothing further in favour of the study of Spencer's 'Education.' (*c*) *Locke on Education.* Here, again, is a classic of undying popularity and of home production, which with Spencer's 'Education' and Roger Ascham's 'Scholemaster,' shares the unique distinction of translation into most of the languages of civilised man. Certainly it is not alone the L.L.A. students who should have more than a bowing acquaintance with what philosopher Locke had to say on education. (*d*) *Quick's Educational Reformers.* Surely no word is needed in these days in advocacy of an acquaintance with the delectable dissertation of this charming writer upon the principles and practices of those who have laboured to discover and to hand down the whole duty of the teacher. To us it seems to argue complete unfitness for the profession of teacher on the part of those who can find anything but profit and pleasure in the immortal pages of Robert Hebert Quick.

A study of these four books would constitute a pleasant year's work to the earnest teacher, and when it is remembered that a successful negotiation of the questions set on these books would mean two-sevenths of the L.L.A. diploma, it needs nothing further to demonstrate the possibility of securing this degree, even in the case of the teacher who is of average intelligence and passably industrious.

The professional value of the title cannot be over-estimated. Many a good appointment has been secured by its possession; whilst, apart from this, the status of a lady teacher who holds this degree is materially enhanced thereby, as it is universally regarded as one of the hall-marks of culture. It is because we are quite sure of our facts in this connection that we contemplate the inclusion of this new feature in THE PRACTICAL TEACHER'S programme, and if these words do but set a few thoughtful minds cogitating as to the wisdom or unwisdom of entering upon the course of study outlined above, it is clear to us that we shall have been doing our duty to ourselves and to the profession, which it is our dearest ambition to leave in better case than we find it.

With these few additional words we once again leave the matter in the hands of our readers, merely adding to those earnest ones who have already written to us, that we shall deeply regret our inability to serve them should it transpire that the demand prove too limited to call for the supply which we will willingly furnish under happier circumstances.

In conclusion, we again inform those who would learn more concerning the diploma than has been told in this and the preceding article on the same subject, that a postcard to the Secretary, L.L.A. Scheme, St. Andrew's University, Scotland, will put them in possession of the syllabus of subjects and details of conditions under which a knowledge of these will result in the right to wear the badge, to secure the diploma, and to use the title of L.L.A.

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

Head Master of the Belvedere Pupil Teachers' Centre, First on Scholarship List, Author of 'Scholarship School Management.'

PUPIL TEACHERS' COURSE.

OCTOBER EXAMINATION, 1897.

EIGHTH MONTH.

WORK TO BE PREPARED.

A.—*English.*

(Students are invited to write for assistance in cases of doubt or difficulty.)

First Year.

1. The Adverb. Learn definition and good classification.

2. Revise half the Latin suffixes, and tabulate the suffixes in the 'Elegy.'

3. Prepare verses 29–32 of Gray's 'Elegy in a Country Churchyard.' Learn the meaning of all allusions and references, and the derivations of the chief words.

Second Year.

1. The Conjunction. Note particularly classification (*a*) according to function and (*b*) according to meaning. Distinguish carefully between Adverbs and Conjunctions.

2. Prepare thoroughly, with examples, the Greek prefixes. Tabulate the prefixes of the first 50 lines of the 'Winter Evening.'

3. Prepare lines 277–307 of the 'Winter Evening' (*Task*, Book IV.). Make sure of the meanings, learn all notes, explanation of allusions, and derivation of chief words. Pay special attention to the paraphrasing.

Third Year.

1. Learn 20 roots and meanings per week.

2. *Julius Cæsar.*—Prepare Act IV., Scene 3, to the end. Note particularly Brutus' speeches in the council of war.

(N. B.—Many Students have written to me for more assistance in this work. Space does not allow of much analysis or paraphrase, but if my readers will let me know the passages which present difficulty in either respect, I shall be pleased either to help them individually or to insert solutions in this course.)

B.—*Arithmetic.*

First Year.

Boys.—Lock. Chapter V. and all examples (Decimals). (Select a few from each.)

Girls.—Dixon and Beach. Example XXXVA., Nos. 30–60.

Second Year.

Boys.—Lock. Examples CXXIV.–CXXVII. (Discount).

Girls.—Dixon and Beach. Example 22.

Third Year.

Boys.—Lock. Work Examples for Exercises Nos. 975–1001, pp. 287 and 288.

Girls.—Dixon and Beach. Read Chapter XXVIII. and work all Exercises.

(The greatest attention must be paid to arrangement and method. The theory of each rule must be carefully learnt as it occurs. The questions in examination always include some questions directly on the theory.)

C.—*Music.*

All Years.—Continue practice in answering questions.

D.—*Spelling.*

Learn 50 words per week from 'Words Commonly Misspelt,' or any good list.

E.—*Geography.*

South America.—Physical features, productions, climate, etc. The various States.

States.	Productions.	Points to Notice.	Towns.
1. Brazil (Republic—President and two Houses. This applies to all the States.)	Sugar, coffee, cotton, cocoa, indiarubber, tobacco, maize, beans, cassava, nuts, wheat, cereals, all kinds of timber, gold, silver, iron, precious stones.	'Selvas,' the low forest-covered plains of the Amazon. 'Campos,' table lands of East and South.	Rio de Janeiro, Pernambuco, Bahia, Para, Santarem.
2. Venezuela (confederation of States).	Coffee, cocoa, hides, cotton, sugar, tobacco, indigo, bark, tallow, dyewoods, timber, and copper ores.	'Llanos,' grassy plains used for stock-raising. Note the quarrel with Venezuela at present referred to a committee.	Caracas (La Guayra, its port), Valencia, Maracaybo.
3. Guiana - - -	As above, especially sugar - - -	English part - - - Dutch part - - - - French part (Penal Settlement).	Demerara and Georgetown. Paramaribo. Cayenne.
4. Colombia (confederation of States).	Extensive forests, gold, silver, platinum, copper, tobacco, coffee, cocoa, ivory, indigo, Peruvian bark.		Bogota, Cartagena, Aspinwall, Panama.
5. Ecuador - - -	As above, and sulphur - - - -	Note volcanoes:—Chimborazo, Cotopaxi, Antisana, Cayambe.	Quito, Cuenca, Guayaquil.
6. Peru - - -	Silver, quicksilver, copper, coal, petroleum, cinchona, sarsaparilla, guano.	Note the llama, alpaca, vicuna.	Lima, Callao, Arica, Mollendo.
7. Bolivia - - -	Silver (Potosi), gold, copper, tin, lead, salt, rice, barley, oats, maize, cotton, coca, indigo, indiarubber, etc.		Sucre, La Paz. No port.
8. Chili - - -	Wheat, barley, maize, oranges, peaches, nitrates, and minerals.	Note Peak of Aconcagua, Desert of Atacama—rainless district.	Santiago, Valparaiso, Concepcion, Iquique, Coquimbo.
9. Argentine Republic -	Wool, hides, linseed, sugar, maize, wheat, tobacco, tallow, Paraguay tea, minerals.	'Pampas,' extensive grassy plains.	Buenos Ayres, Tucuman, Rosario.
10. Paraguay - -	Yerba maté or Paraguay tea, tobacco, rice, wheat, cotton, and sugar.		Asuncion.
11. Uruguay - -	Hides, wool, preserved meat, extract of beef, tallow, wheat, and maize.		Monte Video, Paysandu.

Draw map of each part. Insert all names to be learnt. Prepare an answer on the basins of the Amazon, Orinoco, and La Plata.

F.—*History.*

Victoria, 1837–1854. Chief points :—

(*a*) Rebellion in Canada.
(*b*) The Chartist agitation and its results.
(*c*) The war in Syria.
(*d*) The first Chinese war.
(*e*) The Afghan war and the annexation of Scindia and the Punjab.
(*f*) O'Connell's agitation.
(*g*) Repeal of the Corn Laws, and the Great Exhibition.

(The history of this period must be very carefully prepared.)

G.—*Euclid.*

Second Year.—Book I., Propositions 23–26, and work these deductions :—

1. If three points be taken on the sides of an equilateral triangle at equal distances from the angles, and the points joined, the triangle so formed will be equilateral.

2. A diagonal of a rhombus bisects each of the angles through which it passes.

3. ACB, ADB, are two triangles on the same side of AB such that AC = BD and AD = BC, and AD and BC intersect at O. Show that the triangle AOB is isosceles.

4. The perpendicular is the shortest straight line that can be drawn from a given point to a given straight line, and of others that which is nearer to the perpendicular is less than the more remote.

Third Year.—Book I. Revise propositions 1–10, and work these deductions :—

1. The sum of the diagonals of a quadrilateral is less than the sum of any four lines which can be drawn to the four angles from any point within the figure except their intersection.

2. Find a point such that the perpendiculars let fall from it on two given straight lines shall be respectively equal to two given straight lines. How many such points are there?

3. Two straight lines AB and CD intersect at E, and the triangle AEC is equal to the triangle BED. Show that BC is parallel to AD.

4. If the middle points of any two sides of a triangle be joined, the triangle so cut off is one quarter of the whole.

H.—*Algebra.*

Third Year.—'Scholarship Algebra,' Chapters XVI.–XIX.

I.—*Teaching.*

Second Year.—'Scholarship School Management,' Chapter VII. Finish the Teaching of Arithmetic.

Third Year.—'Scholarship School Management,' Chapter XIV.

QUESTIONS TO BE ANSWERED.

1. *Penmanship.*—Write as specimens of—
(*a*) Largehand : The Afghan Campaigns.
(*b*) Smallhand : There is sweet music here that softly falls.
(Take daily practice from a good model.)

2. *Composition.*—Write an essay each week, selecting from Steamships—Divers and their work—Lighthouses—Lifeboats and their work—A Hard Winter.

3. *Notes of Lessons.*—(A criticism lesson *must* be given each week. First Year P.T.'s should write outline notes, others full notes.)

Multiplication of Decimals—Volcanoes—The Productions of North America—Pepper—Animals of the Cat Kind—Duke of Wellington.

4. *First Year.*

(1) Analyse verse 29 and parse *The next, him, borne, for, can'st, graved, yon.*
(2) ,, ,, 30 ,, *Here, Fortune, unknown, marked him for her own.*
(3) ,, ,, 31 ,, *as largely send, all, tear, 'twas, friend.*
(4) ,, ,, 32 ,, *no further, to disclose, or draw, alike, bosom.*

(5) Say what you can of the derivation of *dirges, array, approach, science, melancholy, sincere, recompense.*

Second Year.

(1) Paraphrase and analyse lines 277–285 and parse *so spent, such, alike to all, ye, fearless, a soul.*

(2) Paraphrase and analyse lines 286–298 and parse *myself creating what I saw quiescent, pendulous, prophesying still though still deceived.*

(3) Paraphrase and analyse lines 229–307 and parse *as the man were, thus oft, home, me to myself.*

(4) Say what you can of the derivation of the following words :—*parlour, contemplative, indisposed, mercurial, ludicrous, expressed, pendulous, superstition, prophesying.*

(5) Give in your own words Cowper's description of 'Evening.'

Third Year.

(1) Paraphrase and analyse :
Act IV., Sc. 3.
(*a*) 'We must die, Messala,
. . . . . I do not think it good.'
(*b*) 'Good reasons must of force
. . . . . these people at our back.'
(*c*) 'There is a tide . . .
. . . or lose our ventures.'

(2) Parse—
'That methinks is strange.'
'Never come such division 'tween our souls.'
'It may be I shall raise you by and by.'
'Bid him set on his powers betimes before.'

(3) Write notes on :—*This cynic—proscription and bills of outlawry—Cicero—our legions—which we will niggard—gentle knave—young bloods.*

5. Describe the surface of Mexico and show the effect of the relief upon the climate. What are the Tierras Calientes?

6. What do you know of the nature and position of Yucatan, Lake Nicaragua, Popocatapetl, Vera Cruz, and Truxillo?

7. Name the states of Central America and say what you can of their people and government.

8. Describe the site and give an account of the Battle of Waterloo.

9. What do you know of the Reform Bill? Why was Reform necessary, and how was it provided for?

10. Who were chiefly instrumental in obtaining the Emancipation of Slaves? How did it affect our colonies?

11. What are some of the main principles to be observed in teaching Arithmetic?

12. What are the uses of School Libraries? Give a few examples of the kinds of books which should be found in them.

SPRING EXAMINATION, 1898.

Before starting a new course for the Spring Examination of 1898 it will be well to direct the careful attention of all students to the detailed syllabus given in Schedule V. of the New Code. It will be seen that candidates for Pupil Teachers now have to prepare a special syllabus of work in place of merely passing the ordinary Standard VI. or VII. examinations. The two subjects which will require most attention are Geography and History. Especially is this the case with girls who have not taken these subjects in their schools. The Geography is 'British Colonies and Dependencies. Interchange of productions, circumstances which determine climate.' A very useful book for this is Meiklejohn's *British Colonies and Dependencies*, Price 6d., specially adapted for this course. The history prescribed is 'Outlines of History of England from 1815 to the present time.' The most suitable book for this will be announced next month.

In the Pupil Teachers' work the chief innovation is the optional subject 'Elementary Science,' which covers the ordinary science of 'Physiography.' It is not clear what the advantage will be in taking up this subject, whether the marks will go towards securing a pass 'well,' or not, but, doubtless, fuller information will be forthcoming.

Taking the subjects in order we have :—

1. *English and Composition.*

First Year.—Grammar, etc., as before. Special book for preparation, Scott's 'Lay of the Last Minstrel,' Canto II.

Second Year.—Parsing, analysis, and paraphrase. Latin prefixes and affixes. Special book, Cowper's 'Task,' Book IV. lines 374 to the end.

Third Year.—Grammar, etc., as before. Special book, Milton's 'Comus.'

There are many editions of the special books. Any of the following will do, but students are advised to get two or three editions where possible :—

Scott's 'Lay of Last Minstrel.'—

(*a*) Cantos I.–III. Macmillan & Co. (In cloth or paper, 1s. 6d.) An excellent edition.
(*b*) Canto II. Blackie's English Classics, 2d.
(*c*) Cantos II. and III. Longmans & Co., 9d.
(*d*) Canto II. W. & R. Chambers, 2d.

All contain notes, but it would be desirable to consult all, as they are very cheap.

Cowper's 'Task,' B. IV.—

(*a*) Macmillans. An excellent edition. 1s.
(*b*) Longmans. 1s.
(*c*) W. & R. Chambers, 4d.

Comus.—

(*a*) Macmillans, cloth, 1s. 3d.; paper, 1s.
(*b*) Longmans, cloth, 1s.
(*c*) Chambers, paper, 4d.

All contain introductions and notes, but the remark above applies.

I should advise each P. T. to get Chambers' Edition and interleave it, and fill in notes, etc. from other editions.

2. *Reading.*—This will in future be taken from special books.

First Year.—Ivanhoe.—Published in many forms and prices from 6d. (Black & Co.) upwards. Marcus Ward's edition at 2s. is a very good one. Blackies also publish it in two volumes in the Home and School Library.

Second Year.—Vicar of Wakefield.—Also published in many editions.

Macmillans have a very good one with notes at 2s.
W. & R. Chambers issue a good pocket edition at 9d.

Third Year.—Macaulay's Essays on Clive and Bunyan.

Essay on Clive.
Macmillan & Co., 2s.
Longmans & Co. (Traveller's Library Edition), 6d.
W. & R. Chambers, 1s.

Essay on Bunyan.
Blackie's, 2d.

It would, however, be well for Third Year P.T.'s to get a complete edition of Macaulay's Essays. They can be obtained in good binding for half-a-crown.

3. *Penmanship.*

I have seen no better books than the Royal Star (Nelson & Son), Nos. 3 and 8, for large and small hand.

4. *Arithmetic.*

There is no change in this subject. There is a wide variety of excellent books to select from.

5. *Geography.*

Physical, Political, and Commercial Geography of British Islands, British North America, and Australasia.

Maps of the British Isles.

Meiklejohn's 'Comparative Geography' will do for this. Blackie's Manuals on the countries named will materially assist.

The memory maps we hope to present to our readers.

6. *History.*

Outlines of British History to death of Edward I.
Macmillans have a volume specially written for this.
Meiklejohn, Ross, Collier, etc., are all good.
Blackie's Synopsis, 1s., should be used.

7. *Teaching.*

'Pupil Teachers' and Scholarship School Management' (Nelson & Son).

8. *Music.*

Stanton's 'Pupil Teachers' Notes' (Curwen & Sons), 4d.

I should be glad to know if many of my readers intend to take up the Elementary Science; if so, I can, perhaps, give some assistance in these columns by means of notes, etc.

I would also impress upon all P.T.'s the utmost necessity of providing themselves with thoroughly good books. Mere cram books are quite useless, the examinations are now very searching and demand wide reading and independent thought.

WORK TO BE PREPARED.

FIRST MONTH—MAY.

A.—*English.*

First Year.

1. Learn exact definitions of all the parts of speech.
2. Learn Anglo-Saxon noun-affixes.
3. Prepare lines 1–40 of the 'Lay of the Last Minstrel,' with all meanings, allusions, etc.

Second Year.

1. Prepare the Noun thoroughly.
2. Learn Anglo-Saxon prefixes.
3. Prepare lines 374–419 of the *Task*, 'Winter Evening.'

Be prepared to analyse and paraphrase every part and parse any word.

Third Year.

1. Learn 20 roots and meanings per week.
2. Prepare lines 1–92 'Comus' with all meanings, etc.

Be prepared to paraphrase and analyse any part and parse any word.

N.B.—If students will send up any difficulties, they will be explained in these columns or by post.

The whole of the works will be paraphrased during the year.

B.—*Arithmetic.*

First Year.

Boys.—The theory of Vulgar Fractions.
Girls.—The theory of G.C.M. and the method of working.

Second Year.

Boys.—Proportion—Compound—Work by Method of Unity.
Girls.—Multiplication of Vulgar Fractions.

Third Year.

Boys.—Square Root.
Girls.—Simple Proportion by Ratios and Method of Unity.

C.—*Music.*

First Year.—The structure of the common Major Scale.
Second Year.—First Removes of Key.
Third Year.—The Minor Scale and its structure.

D.—*Spelling.*

Fifty words per week from any good list or 'Words Commonly Misspelt.'

E.—*Geography.*

The Physical Geography of England.

F.—*History.*

The Britons. Cæsar's invasions. British manners, customs, clothing, trade, building, modes of warfare, etc.

G.—*Euclid.*

Second Year.—Learn definitions, axioms, and postulates.
Third Year.—Propositions 27–30, with four deductions per week.

H.—*Algebra.*

The first four rules.

I.—*Teaching.*

Second Year.—'Scholarship School Management.' First half of Chapter I.

Third Year.—'Scholarship School Management.' Chapter VIII. The Teaching of Grammar and Repetition.

Complete test papers will be set next month on all the work given above. Students are requested to write for any assistance they need; by this means the course may be made most useful to all.

SCHOLARSHIP COURSE FOR DECEMBER 1897.

5TH MONTH—MAY 1897.

1. *Reading.* } Ten minutes' practice at each daily. For Reading
2. *Writing.* } take 'The Vicar of Wakefield.'

3. *Spelling.*—50 words per week from 'Words Commonly Misspelt,' or any good list. Test by Dictation from a good author.

4. *Composition.*—Write one or two essays each week, selecting from the following :—

Criticism of some book you have read—Arctic Exploration—'Sweet are the uses of adversity'—Warfare, ancient and modern—The influence of climate on national character—The Diamond Jubilee—Holidays—'Rolling stone gathers no moss.'

(Read up all you can about your subject. Arrange matter in sections, each dealing with some phase of the subject. Send up essay each month for criticism.)

5. *English.*—

(*a*) The Adverb, fully. Learn a good classification.
(*b*) 25 Roots and meanings per week.
(*c*) Meiklejohn, Chapter V.—Bacon, Shakespeare, Milton, Butler, Dryden, Taylor, Hobbes, Bunyan, and Locke.

6. *Arithmetic.*—Proportion and Division into Proportional Parts. Read up the theory carefully. A test paper will be given next month.

Girls.—Algebra. Blackie's Elementary. Multiplication.

7. *Algebra.*—Hall & Knight, Exercises XVII*g*. to XIX*c*.

8. *Euclid.*—Book I., Props. 30–37. Deductions. Egan's Exercises, 80–100.

9. *Geography.*

(*a*) Cape Colony and Possessions in South Africa.

(*b*) Revise Asia Minor, Persia, Arabia, Afghanistan, Beloochistan, and the Central States.

Chief Points :—

(1) Cape Colony includes Cape Colony proper, Griqualand West, East Griqualand, Tembuland, Transkei Territories, and Walfisch Bay. Area 221,000 sq. miles, and population 1¾ millions.

(2) Coast line—St. Helena Bay, Table Bay, False Bay, Simon's Bay, Mossel Bay, and Algoa Bay; C. of Good Hope, and C. Agulhas.

(3) Relief—Note particularly the terraces (*a*) from coast to Lange Berge, 10 to 50 miles wide; (*b*) Lange Berge to the Zwarte Berg; and (*c*) from Zwarte Berg to Nieuveld, Schnee Berg and Storm Berg mountains. Between the two latter terraces lies the Great Karroo.

(4) Rivers—Orange River or Gariep, Olifants and Great Berg Rivers, Breede, Gauritz, Gamtoos, Sunday River, and Fish River, useless for navigation, alternately dry and torrents.

(5) Climate—Temperate, dry, and particularly healthy.

(6) Productions—

(*a*) Animal—Wild: Antelope, elephant, hippopotamus, leopard, jackal, hyæna, buffalo, etc.

Domestic: Sheep, cattle, goats, horses.

Birds: Ostrich (note ostrich farming), secretary bird, honey guide, etc.

(*b*) Vegetable—Maize, wheat, oats, barley, millet, potato, the vine (wine-making an important industry), fruits of all kinds, flowers, particularly heaths and aloes.

(*c*) Mineral—Diamonds (Kimberley), copper (in Namaqua Land), gold, coal, manganese, lead, salt, clay, and granite.

(7) Exports—Diamonds, wool, hides, feathers, copper.

Imports—Haberdashery, hardware, cotton goods, machinery, woollen goods, arms, spirits, etc.

(8) People—Note particularly the Dutch element, the native races, Basutos, Hottentots, Bushmen.

(9) Chief Towns—Cape Town, Kimberley, Port Elizabeth, Graham's Town, King William's Town, Paarl, E. London, Graaf Reynet, Worcester, Uitenhage, and Cradock.

(10) Government—

(*a*) Executive—Governor and Executive Council.

(*b*) Legislative Council.

(*c*) House of Assembly.

This is the merest outline of what must be prepared. Draw a map. Enter all places to be remembered, and practise till thoroughly known.)

Natal—Production and general features similar to Cape Colony.

Towns—Durban, Pietermaritzburg, Newcastle, Ladysmith, Estcourt.

Government—Similar to Cape.

10. *History.—Henry VII., Henry VIII., Edward VI., Mary, and Elizabeth.*

Henry VII.—1485-1509.

Chief points :—

(*a*) The first of the Tudors. Note particularly Henry's claim to the throne. He represented the Lancastrian line, and by his marriage with Elizabeth, heiress of York, united the rival houses. His descent and that of his wife must be carefully learnt.

(*b*) A new era. The Dark Ages passed away, and modern history commences. Marked by :—

(1) Cultivation of foreign alliances by diplomacy.

(2) An increase in trade and commerce.

(3) Great maritime discoveries.

(4) The great revival of learning (a note on which will be given).

(*c*) Yorkist plots and rebellions.

(1) 1486. Lords Lovel and Stafford.

(2) 1487. Lambert Simnel.

(3) 1492–99. Perkin Warbeck.

(*d*) Foreign policy.—Peace at any price.

France: Henry bought off by the Treaty of Etaples.

Spain: Alliance by marriage of Prince Arthur, and afterwards Prince Henry, with Catherine of Arragon.

Scotland: Alliance by marriage of Margaret to James.

(Both these marriages are very important. The first indirectly led to the separation of the English Church from the Romish, and the second to the succession of the Stuarts.)

Ireland: Conquest prepared by Poyning's Act, which carefully note.

(*e*) Home government strong. Trade with Flanders developed. Power of barons kept down by 1487 Statute of Livery and Maintenance, forbidding the maintenance of a large force of armed retainers. Money amassed for the king by Morton, Empson, and Dudley.

Causes of the High Prerogative exercised by the Tudors :—

The Tudor monarchs ruled more absolutely in England than any before or after them.

The causes of this were :—

(*a*) The results of the Wars of the Roses, which had nearly destroyed the powerful baronial families.

(*b*) The subserviency of the new nobles created by them.

(*c*) The subserviency of the Parliament, who were willing, as were the people, to put up with much, so long as trade flourished and peace was maintained.

(*d*) The jealousy of the two religious bodies.

(*e*) The influence of the Star Chamber, which superseded the ordinary courts of justice, fined members of Parliament who opposed the Crown, juries who gave verdicts against the Crown, and those who refused to subscribe to the Benevolences which were demanded.

(*f*) The personal character of the Tudors. By nature imperative and domineering, yet astute statesmen, they skilfully kept clear of any complications which would tend to lessen their power, and seized every opportunity to advance it. Yet they carefully watched the general feeling of the people, and knew when they could obtain favour by conceding points.

Henry VIII.—1509–1529.

Chief points.

Foreign affairs :—

Henry joined the Holy League formed by the Pope to expel the French from Italy, but little active fighting took place.

In 1513 the French were defeated at Turenne—the Battle of Spurs. The same year the Scots invaded England, to assist the French, but were totally defeated at the Battle of Flodden. In 1520 Henry met Francis at the Field of the Cloth of Gold, although he afterwards joined Charles of Spain against him. Nothing of importance occurred before the Peace of Cambrai in 1529. Henry felt proud of holding, or thinking he held, the balance of power between France and Germany.

Home affairs :—

This was the period of Wolsey's greatest power, of whom a life must be carefully prepared. Money was raised by Benevolences, enforced by the help of the Star Chamber. Wolsey fell by intriguing with France and Germany alternately for the Papal Chair, and on the question of the King's divorce arising, he was forced into the position of opposing the King or relinquishing his own ambition. Doing the former, he fell.

Edward VI.—

Chief points :—

(*a*) The mode of government—Somerset Protector, afterwards Northumberland.

(*b*) The war with Scotland, and the disastrous defeat of the Scots at Pinkie.

(*c*) The progress of the Reformation.

(*d*) Ket's rebellion, and other insurrections.

(*e*) Fall of Somerset, and death of the King.

The chief points on which progress was made in the Reformed Religion were :—

All Statutes concerning the punishment of heretics and Lollards, including the Statute of Six Articles, were repealed.

Sacrament was to be administered in both kinds.

Two Acts of Uniformity were passed, enforcing the use of the new Service Book.

1549. Edward's First Prayer Book was issued, but being considered too Romanist, a revised edition was published in 1552.

A Book of Homilies and the Forty-Two Articles were issued.

A copy of the Bible was ordered to be placed in every church.

With the money obtained from the dissolution of monasteries, etc., many schools were founded; 'King Edward Schools' being found at the present time in many towns.

Mary I.—1553–1558.

Chief points.

(1) The short reign of Lady Jane Grey—acting under advice of Northumberland—and the circumstances leading to Mary's accession.

(2) The re-introduction of Roman Catholicism, and the consequent Marian persecution.

(3) Marriage with Philip, against national desire—Wyatt's rebellion.

(4) The war with France to aid the schemes of Philip, and the loss of Calais, the only remaining Continental possession.

Lives of Northumberland, Lady Jane Grey, Cranmer, etc., should be prepared.

(This is a most important reign, and must be carefully studied.)

Elizabeth.

Chief points :—

(1) *State of Affairs at Accession.*—No army, no navy, coinage debased, country in debt and engaged in a senseless war, trade stagnant, and the people divided into two hostile religious camps. By the end of the reign all this was altered, and it is by studying how this was brought about that the true greatness of Elizabeth's reign becomes apparent.

(2) *Foreign Policy.*—In the early years—peace at any price. The two powerful nations which threatened England were France and Spain, and by playing the one against the other, or the Protestants against the Catholics in France, or the Netherlands against Spain, the Queen and her advisers ensured that England should be left alone to recuperate her strength. As England grew stronger, Elizabeth became more independent, and finally, by crushing the Armada, not only demonstrated the fact that England was sufficient to cripple the haughty Spaniards, but ensured the future of the Protestant religion.

(3) *Plots against the Queen.*

1571.—Ridolfi's—object to release Mary and marry her to Norfolk.

1584.—Throgmorton's—with similar aim.

1586.—Babington's, resulting in the execution of Mary, which was a challenge to the Catholic world.

(4) *Home Policy.*—To make England strong by making her people self-reliant and patriotic. Elizabeth trusted her people, and appealed to their better instincts, and the wisdom of her action is abundantly shown by results. The enormous increase in wealth, in commerce and in enterprise, is most marked.

Thirty thousand Flemish weavers fled from Flanders to England and laid the foundation of our cloth manufactures. Companies were formed to trade to all parts of the known world, and ere long gold, silver, and tobacco were coming from America, gold dust and ivory from Africa, silks and cottons from India, spices from the East Indies. In 1560 Sir Thomas Gresham built the Royal Exchange, which was opened by the Queen.

(5) *Religious Matters.*

In these Elizabeth steered a middle course, reconciling as far as possible the two parties, and leaving the Catholics alone so long as they did not interfere in politics.

1559.—Act of Supremacy and Act of Uniformity.

Ecclesiastical High Commission Court established—abolished in 1641.

1570.—Pius V. finding Elizabeth 'obdurate,' he excommunicated her, which Parliament answered by declaring reconciliation with the Church of Rome to be treason.

1580.—The Jesuits invaded England to preach rebellion, etc.

1581.—A severe Act forbade mass in private houses.

The Catholics rallied round Elizabeth to resist the Armada as willingly as did the Protestants. This shows the confidence the rule of the Queen had inspired.

(6) *Parliament.*—Not often called. Note the attack on Monopolies in 1597–1601 and the Poor Laws of 1601.

(7) *Literature.*—The grand outburst of national song is also a striking testimony to the patriotic spirit evoked, and to the advance made in thought and education.

The Reformation.

1. Early attempts of Reformation :—

(1) The Albigenses, who rose in insurrection during the Pontificate of Innocent III., and were crushed by De Montfort.

(2) The Lollards, in England and Bohemia in the fourteenth century, who were suppressed by the Council of Constance reforming some of the most scandalous abuses, and instituting a merciless persecution.

2. Causes which contributed to the Progress of the Reformation :—

(1) The great Papal schism, when there were two Popes, each asserting his own infallibility.

(2) The vices of the Roman Court, especially under Alexander VI. and Julius II.

(3) The immoral lives of the clergy, and the custom of Benefit of Clergy, by which crimes could be committed with impunity.

(4) The jealousy of the laity excited by the wealth of the clergy.

(5) The invention of printing, by which the Scriptures and writings of the Reformers were rapidly circulated all over Europe.

(6) The great revival of learning about the beginning of the sixteenth century.

3. Reformation in Germany :—

The immediate cause was the sale of indulgences to raise money to complete St. Peter's at Rome. The purchasers of these indulgences obtained, it was said, absolution from their sins, and exemption from purgatory after death. Tetzel, head of the Dominican Friars, sold them everywhere with shameless indecency. He was opposed by Martin Luther, who was excommunicated in 1520, summoned before the Diet of Worms, imprisoned, and afterwards released. He published a German Translation of the Scriptures. In 1529 the Reformers were called Protestants, from their protesting against the decision of the Diet of Spires. In 1530 they presented their famous Confession of Faith at Augsburg. This was drawn up by Melancthon, one of the most famous scholars of the age, and, though clearly worded, placed insuperable difficulties in the way of reconciliation. In 1530 the Protestant States entered into the League of Smalcalde for self-defence, and the rupture was complete.

4. Reformation in Switzerland :—

Zwingle began, like Luther, by opposing the sale of indulgences, but he inculcated milder doctrines than the German. After his death Calvin succeeded him, and established a church republic at Geneva.

5. Subjects of Controversy :—

The Reformers did not agree at all in their ideas, and the subsequent disputes retarded the progress of the Reformation. Luther's followers called themselves Evangelical Christians; the followers of Calvin, 'The Reformed Church.' The Calvinists believed in absolute predestination, and in government of the Church by elders—the modern Presbyterianism. The point which drew forth most discussion was the doctrine of Transubstantiation.

6. Reformation in England :—

(*a*) Henry VIII. was not a Reformer. The separation from Rome in 1534, and suppression of the monasteries in 1535–5, had so humbled the English clergy that they did not oppose any measure which the King brought forward. Henry was not a heretic, like Luther; he denied no doctrine of the Romish Church. He only separated himself from their communion, denied papal jurisdiction, and declared himself Head of the Church. He persecuted alike the Protestants and those who believed in the Pope's supremacy.

(*b*) Articles of 1536.

In 1536 the King published a book of articles to settle all differences. These articles declared the necessity for belief in—

(1) The Three Creeds.

(2) Worship of images and the invocation of saints were enjoined as highly profitable.

(3) Transubstantiation and masses for the dead.

These were embodied in the Bishop's Book, 1537.

(*c*) Publication of the Scriptures :—

(1) Wycliffe's Bible.

(2) A translation based on Wycliffe's, but strongly tinged with Lollard opinions.

(3) Tyndale's (1530 and onwards) New Testament first, then the Pentateuch.

(4) Miles Coverdale's, 1535. Published at Hamburg.

(5) Matthew's, 1537. Reprinted in 1538 as Cranmer's, or the Great Bible. (From this the Prayer-book version of the Psalms is given.)

(*d*) The contest between Catholicism and Protestantism was continued in England till 1689.

7. Statute of Six Articles.

Acting under the advice of Gardiner, Bishop of Winchester, the King enacted this statute ('The Bloody Statute'), and enforced its observance by terrible penalties. All were adjudged heretics, and were liable to death by burning, or else to fine and imprisonment, who did not adhere to :—

(1) Transubstantiation.
(2) Communion of one kind.
(3) Celibacy of the clergy.
(4) Vows of chastity.
(5) Private masses for the dead.
(6) Auricular confession.

Cranmer sent his wife to Germany, and Latimer resigned his see. The use of the Bible was restrained, anyone other than a lord or a gentleman reading it being liable to a month's imprisonment. The Articles remained the established rule of faith until the end of Henry's reign. They were confirmed in 1540 by the publication of 'The Necessary Doctrine and Erudition of a Christian Man,' which in 1543 was again issued under the title of 'The King's Primer.' This terminated the progress which Henry made towards Reformation. He had sanctioned a return to the use of the English language in the public services of the Church, authorised the publication and at one time the true reading of the Scriptures, and he had in some few points of doctrine approached the Reformation.

On the other hand, he retained a capricious partiality for the Romish practices in those very points where pious Catholics desired an alteration, *e.g.* the denial of the cup and celibacy of the clergy. The doctrine of transubstantiation, which was the great superstition in the eyes of the Reformers, he always insisted upon under the penalty of death by fire.

The Reformation in England was, however, gradually gaining ground, as shown by—

(*a*) The circulation of the Reformers' books and of the Holy Scriptures.
(*b*) The popular belief that vice and corruption prevailed in the Church.
(*c*) The continued persecution which had to be resorted to.

11. *Teaching.*—'Scholarship School Management,' Chapter V.

The Teaching of Writing, etc.

12. *Domestic Economy.*—Clothing.

13. *Music.*—'School Music Teacher,' Chapter V.

14. *French.*—Next 3 pages of *La Grammaire.*

Those students taking French would do well to procure a little book issued by Hachette & Co., containing 40 or 50 papers on *La Grammaire*, price 6d.

TEST QUESTIONS.

1. Write as specimens of copy-setting :—

(*a*) Largehand :—
Kilimanjaro, Metallurgical, Nullifying, Ozymandias.

(*b*) Smallhand :—
Not wholly in the busy world, nor quite
Beyond it, blooms the garden that I love.

2. Analyse the following passages and parse words in italics :—

(*a*) In conclusion he observed that *although* he *could* not *allow* of the style *calling* their *privileges* an undoubted right and *inheritance*, but could *rather* have wished that they had said their privileges were derived from the grace and permission of his ancestors and *himself* (*for* most of them had grown from precedent, which rather shows a toleration *than inheritance*), yet he gave them his royal assurance that, *as long* as they continued *themselves* within the limits of their duty, he would be as careful *to maintain* their lawful liberties and privileges as he would his *own* prerogative, *so* that their House *did* not *touch* on that prerogative which would enforce him *or* any just king *to retrench* their privileges.

(*b*)
He who *grown aged* in this world of woe,
In deeds, not years, piercing the depths of life,
So that *no* wonder waits him; nor *below*
Can love or sorrow, fame, ambition, strife
Cut to his heart *again* with the keen knife
Of silent, sharp endurance: he *can tell*
Why thought seeks refuge in lone caves, *yet rife*
With airy images and shapes which dwell
Still, *unimpaired, though* old, in the soul's haunted cell.

(*c*)
Cowards die *many times* before their deaths;
The *valiant* never taste of death *but once.*
Of all the wonders that I *yet* have heard,
It seems to me most *strange* that men should fear
Seeing that death, a necessary *end,*
Will come when it *will* come.

(*d*) *There* is no vice that doth *so* cover a man with shame *as to be found false* and perfidious; and therefore Montaigne saith prettily when he inquired the reason *why* the word of the lie should be *such* a disgrace and such an odious charge: saith he, 'If it *be* well weighed, *to say* that a man lieth is *as* much as *to say* that he is brave towards God and a coward towards man; *for* a lie faces God and shrinks from man.'

3. Explain the difference between the gerunds and participles. What are the various uses of the Infinitive Mood?

4. Work the following :—

(1) State in decimal form the average of the following quantities :—

$\frac{7}{12}$ of $\frac{1}{3}$, ·01$\dot{8}$, 0, 3, and $\sqrt{2\frac{7}{9}}$. Ans. 1·007$\dot{6}$.

(2) A cask which holds 20 gallons is filled with 15 gallons of brandy and 5 of water. 4 gallons of the mixture are then drawn off and the cask again filled with water. Find the percentage of brandy in the second mixture. Ans. 60.

(3) A man added 20 per cent. to his capital each year, and in 4 years it amounted to £5,184. What was his capital at first? Ans. £2,500.

(4) If $\frac{7}{15}$ of an estate be worth 200 guineas, and the value of the estate be increased ·075 per cent. by improvements, find the value of $\frac{2}{45}$ of the improved estate. Ans. £240 4s. 2$\frac{2}{7}$d.

(5) For what sum should a ship worth £7,250 be insured at £3 6s. 8d. per cent., so that the owner might recover, in case of loss, the value of the ship and insurance. Ans. £7,500.

(6) A tradesman's prices are 20 per cent. above cost price, and he allows a customer 10 per cent. on his bill. What profit does he make? Ans. 8 per cent.

(7) A man speculated with £1,000 and gained 10 per cent., speculated again with the amount and lost 10 per cent., again speculated and gained 10 per cent., and then lost 10 per cent. How much was he then worth? Ans. £980 2s.

(8) An ironmonger bought nails at 18s. 6d. per cwt. and sold them at 3d. per lb.; what did he gain or lose per cent.? Ans. 51$\frac{1}{3}$.

5. Say what you can of the industries of Australia.

6. Describe the government of the Australian colonies.

7. Trace the causes and results of the Wars of the Roses.

8. What constitutional advances were made under the Lancastrian kings?

9. On what does the value of tea and coffee depend? Give arguments for and against the use of alcoholic drinks.

10. Write notes of a lesson on Roots of Plants, Simple Interest, or Thrift.

11. In what manner can Reading be improved, beyond the usual exercise in school?

CORRESPONDENCE.

RULES.

1. Individual assistance will be given as far as possible by advice, solution of difficulties in any subjects, model answers, etc.

2. Specimens of Writing, Paraphrasing, Maps, Composition, etc., will be marked and criticised gratis.

3. To assist students in rural districts, Freehand or Model Drawings will be corrected and marked, with hints for improvement, etc., and returned if accompanied by a postage stamp.

4. As a rule, all replies will appear in the Correspondence Column, but anyone desiring an immediate reply may obtain it by enclosing a stamped addressed envelope.

5. To ensure an answer in the next issue queries must be sent by the 15th of each month.

6. Name and address of sender, with coupon of current number of the PRACTICAL TEACHER, and *nom de plume* if desired, must be enclosed.

All communications and queries with regard to the PUPIL TEACHERS' AND SCHOLARSHIP COURSE should be addressed to 'A. T. FLUX, 12, Lower Park Road, Belvedere, Kent.'

ANSWERS TO CORRESPONDENTS.

H.P. and others.—You will find what you want above.

J.R.P.—You must take Elementary Physiography or the advanced stage of some subject in which you pass elementary this year.

ANSWERED BY POST.—J.H. (Wellington); J.G.B. (Stowmarket); D.G.G. (Cross Wood); S.H. (Halifax); F.M. (Bath); E.L.H. (Wolverhampton); W.H.C. (Callington); C.L. (Thrapston); E.J.C. (Eastwood); B.O.R. (Airdrie); C.D. (Birmingham); J.C. (Aird); M.R. (Rhymney); W.M. (Brecon); E.G. (Diss); J.G.A. (Bedford).

A NEW BACILLUS.—Professor Giuseppe Sanarelli, Director of the Uruguayan Institute of Experimental Hygiene, has discovered the bacillus of yellow fever, and will shortly publish the results of his experiments.

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A NEW FOOD FOR CATTLE.—A very interesting description of a new food for cattle, 'molasses mull,' has been given to the Foreign Office by Consul Powell. Agriculturists in Germany have for some years been experimenting with molasses as a mode of fattening cattle and sheep. One of the difficulties that had to be overcome was that of obtaining the raw molasses with fifty per cent. of sugar remaining in it, in consequence of the molasses being subjected to a further process for the extraction of the sugar after passing out of the original manufactory. Then the molasses in the German market contain salts prejudicial to the health of cattle. To meet the latter difficulty, a mixture has been made of molasses with a dust, or mull, obtained from peat. This dust, or mull, is obtained from moss turf by being torn up or teased out by a machine for making moss-litter called a Wolf. It is taken from the upper strata of high-lying peat moors and consists largely of the dried but non-decomposed fibre of *Sphagnum cuspidatum* and the *Eriophorum latifolium*. The acids contained in the moss turf, more especially the humic acids, neutralise the salts of proteine of potassium held by the molasses and render them harmless, the action of the mull counteracting the severe purging caused by the use of molasses alone, which is the chief objection to its use as fodder.

OUR 1897 CERTIFICATE CLASS.

BY J. C. HOROBIN, M.A.,

Principal, Cavendish College, Cambridge.

The Examination for Certificates will commence on Monday, 12th July 1897, at 2 p.m.

The general conditions for candidates are to be found in Articles 55–64 and 116–121 of the current Code.

Questions and Solutions in Logic.

1. Give the genus, differentia, a property, and an accident of Money, Conservative, Triangle.

2. What is meant by 'Fundamentum Divisionis' and 'Cross Division'? Illustrate by examples.

3. Give the contrary and contradictory of the following propositions:—

(*a*) The people of England are neither deficient in spirit nor understanding.

(*b*) There are venomous snakes found in England.

4. Why cannot an A proposition be converted simply? Express in logical form and convert—

'Rolling stones gather no moss.'

5. Distinguish Deduction from Induction. Is argument from analogy a deductive or an inductive argument?

6. Give instances of the fallacies of—

(1) Accident.
(2) Ignoratio Elenchi.
(3) Petitio Principii.
(4) Composition.

Solutions.

1. (*a*) Medium of exchange.
One or more of precious metals.
Portability.
Stamped in the Mint.

(*b*) Politician.
Objecting to reform.
Distrusting new ideas in politics.
Admirer of Salisbury.

(*c*) Figure.
Three-sided.
Interior angles equal two right angles.
Isosceles.

2. F. D. means the principle on which a term is divided up.
E.g.—Figure might be divided up on the basis of—
(*a*) Number of sides.
(*b*) Nature of angles.
C. D. is where more than one F.D. is employed.
E.g.—If figures were divided into triangles, rectangles, and polygons.

3. *Contrary*—
The people of England are deficient both in spirit and understanding.
Some venomous snakes are not found in England.
Contradictory—
The people of England are deficient either in spirit or understanding.
No venomous snakes are found in England.

4. Because the predicate is undistributed, and the subject in conversion becomes the predicate and must therefore be undistributed.

5. Deduction consists in inferring a conclusion from a general law.
Induction is the process of inferring a general law from particular phenomena.
An argument from analogy is inductive, for it is grounded on points of resemblance in two or more phenomena; and other resemblances are inferred.

It differs from strict induction in the lesser generality of the experience.

6. Interference with personal liberty is to be blamed.

A man who prevents a madman from using a razor interferes with his personal liberty; therefore he is to be blamed.

Force is no argument, therefore the disorders in Crete ought not to be repressed by force.

Such opinions ought to be suppressed by the State, for they are unconstitutional.

Six and three are even and odd, six and three make nine; therefor nine is even and odd.

Specimen Questions and Answers in School Management.

1. Explain as clearly as possible how the memory operates, how it can be strengthened, and point out some of the best and worst memory exercises.

The process of memory consists in getting the mind into the same state as when the thing desired to be remembered was a precept.

From the things of similar kind recollected, the mind proceeds step-wise until the train of association is complete.

Hence { Cultivate observation, Attention, Repetition, Association.

Memory Exercises are { Bad or Good } { Time { Mind tired. ,, fresh. } or Kind { Association by sound or mere contiguity. Association by cause and effect. }

2. What is meant by the faculty of observation? Why should it be exercised, and how is this best done with young children?

Sensation is the mental state consequent on the external excitation of one or more of the organs of sense.

Perception is the result of present plus past sensations.

Observation is ordered perception.

Observation should be exercised to { Develop for its intrinsic value. As the basis of { Perception. Memory. }

Kindergarten { Gifts. Modelling.

Object lessons in the science sense not READING ABOUT objects.

N.B.—The contrasts should be as great as possible until discrimination develops.

3. How do you distinguish Psychology and Ethics?

PSYCHOLOGY.	ETHICS.
Descriptive.	Practical and Regulative.
Considers the elements, origin and growth of the facts of consciousness.	Considers the validity or otherwise of the acts resulting from consciousness.
Considers what is desired.	What *ought* to desire.
Considers how act.	How *should* act.
Nature and origin of moral faculty.	Duty.
Studies machinery.	What ought to be done with it.

Questions and Solutions in Arithmetic.

1. A has to perform a journey of 46 miles, which he can do in 10 hours; B can do the same in 13 hours. If they start at the same moment from opposite ends of the journey and walk towards each other, in how many hours will they meet?

A travels $4\frac{6}{10}$ miles per hour $= 4\frac{3}{5}$;

B ,, $\frac{46}{13}$,, ,, $= 3\frac{7}{13}$;

∴ A and B together walk $4\frac{3}{5} + 3\frac{7}{13}$ miles per hour $= 8\frac{9}{65}$;

∴ Number of hours they walk before meeting

$$= \frac{\text{distance}}{\text{rate}} = \frac{46}{8\frac{9}{65}} = 5\frac{15}{23}.$$

2. A watch loses at the rate of 35 seconds per hour. It is set right at 1 p.m. on Monday, what will be the time by it at 5.15 p.m. on the following Friday?

From Monday 1 p.m. to the following Friday 5.15 p.m. is $100\frac{1}{4}$ hours.

In 1 hour the watch loses $\frac{7}{12}$ minute.

∴ In $100\frac{1}{4}$ hours the watch loses $(\frac{7}{12} \times 100\frac{1}{4})$ min.,

i.e., 58 min. $28\frac{3}{4}$ sec.

Time indicated = 5 hrs. 15 min. — 58 min. $28\frac{3}{4}$ sec.

= 16 min. $31\frac{1}{4}$ sec. past 4.

3. At what time between 6 and 7 o'clock will the hands of a watch be together?

Note.—In questions relating to clocks remember that the minute-hand passes over 60 minute-spaces while the hour-hand passes over 5 minute-spaces, and that therefore the minute-hand gains 55 minute-spaces in an hour.

Now, at 6 o'clock, the minute-hand is 30 minute-spaces behind the hour-hand.

Since the minute-hand gains 55 minute-spaces in 60 minutes,

∴ ,, ,, 1 minute-space in $\frac{60}{55}$ minutes,

∴ ,, ,, 30 minute-spaces in $\frac{60}{55} \times 30$ minutes.

∴ 30 minutes will be gained in $32\frac{8}{11}$ minutes.

Hence the time required is $32\frac{8}{11}$ minutes past 6.

4. A bath can be filled by means of a tap in 3 minutes; by a second in 5 minutes, and emptied by another in $7\frac{1}{2}$ minutes. If the bath be empty and all the taps opened, how long would it take to fill it?

In 1 minute the first tap will fill $\frac{1}{3}$ of the bath;

,, ,, second ,, $\frac{1}{5}$,, ,,

,, ,, third will empty $\frac{2}{15}$,, ,,

∴ In 1 minute all three taps will fill $(\frac{1}{3} + \frac{1}{5} - \frac{2}{15})$ of the bath; and $\frac{1}{3} + \frac{1}{5} - \frac{2}{15} = \frac{8}{15}$;

∴ $\frac{8}{15}$ of the bath is filled in 1 minute;

∴ the whole will be filled in 1 minute $\div \frac{8}{15} = 2\frac{1}{2}$ minutes.

5. A room is 14 ft. 9 ins. long, 9 ft. 3 ins. broad, and 10 ft. 6 ins. high. It contains two windows, 5 ft. 6 ins. by 4 ft.; 3 doors, 6 ft. by 3 ft., and a fireplace $6\frac{1}{2}$ ft. by 4 ft.; how much will it cost to paper the room with paper 1 ft. 7 ins. wide, which costs $2\frac{1}{2}$d. per yard?

Area of walls = $\{2(14\frac{3}{4} + 9\frac{1}{4}) \times 10\frac{1}{2}\}$ sq. ft.

= 504 sq. ft.

Area of doors = $(6 \times 3 \times 3)$ sq. ft. = 54 sq. ft.

Area of windows = $(5\frac{1}{2} \times 4 \times 2)$ sq. ft. = 44 sq. ft.

Area of fireplace = $(6\frac{1}{2} \times 4)$ sq. ft. = 26 sq. ft.

∴ Area of paper required = $504 - (54 + 44 + 26)$ sq. ft.

= 380 sq. ft.

∴ Length of paper required = $(380 \div 1\frac{8}{9})$ ft. = 240 ft. = 80 yds.

∴ Cost of paper = $2\frac{1}{2}$d. $\times$ 80 = 16s. 8d.

6. A room 20 ft. by 16 ft. has a Turkey carpet in it, a border 2 ft. wide all round being left uncovered by the carpet. The border was stained at 2d. per square foot, and the carpet cost 13s. 6d. per square yard; what was the total cost?

The border being 2 ft. wide all round the room,

the length of the carpet = (20 ft. — 2 ft. $\times$ 2) = 16 ft.,

and the breadth = (16 ft. — 2 ft. $\times$ 2) = 12 ft.;

∴ Area of carpet = (16×12) sq. ft.

$$= \frac{16 \times 12}{9} \text{ sq. yds.}$$

$= \frac{64}{3}$ sq. yds.

∴ Cost of carpet = $\frac{27}{2}$s. $\times \frac{64}{3} = £14$ 8s.

Area of border = whole area of room

— carpet area = $(20 \times 16 - 16 \times 12)$ sq. ft.

∴ Cost of staining at 2d. per sq. ft.

= 128 $\times$ 2d. = £1 1s. 4d.

∴ Total cost = £15 9s. 4d.

QUESTIONS FOR TESTS.

FIRST YEAR.

1. Write in large, half-text, and small hand:—

Imperial Federation.

2. Dictation:—

In the torrid and temperate zones | the sun shines in the heavens every day | throughout the year; | but from the inhabitants | of some portions of the frigid zones | he hides him-

self completely | for months together;| consequently | the polar areas are favoured | with his presence | for a much less time annually | than are the two other zones, | and thus receive less solar heat. | Scientific men have ascertained that | when the sun's rays | fall on a place at an angle of 60° | above the horizon, | that place receives | only three-fourths as much heat | as when the rays descend vertically ; | when at 50° | two-thirds as much; | when at 35° | only about half as much, | and so on.

School Management.

1. In what circumstances is it advisable to teach all the classes the same subjects at the same hours? In what order should you propose to teach reading, writing, and arithmetic during the day, and why?

2. How far can the teaching of English Grammar be made to bear practically upon the oral answering and written exercises of scholars?

3. Write notes of a lesson on these subjects :—
(*a*) Greatest Common Measure.
(*b*) Arctic Voyages.
(*c*) The Adjective Sentence.

Composition.

1. The Queen's Reign.
2. The Violet.
3. Trades Unions.

Arithmetic.

1. (*a*) How would you briefly explain the rule for dividing one vulgar fraction by another?
(*b*) Give a general rule for division of decimals.
(*c*) What is the general form of the denominator of a fraction which can be expressed as a terminating decimal?
(*d*) Define ratio, present worth, average.
(*e*) State briefly the advantages and disadvantages of decimalising the coinage in this country.

2. If the manufacturer makes a profit of 20 per cent., the wholesale dealer a profit of 25 per cent., and the shopkeeper a profit of 40 per cent., what was the cost of the manufacture of an article bought at a shop for 17s. 6d.?

3. If £3,256 15s. be paid for £3,908 2s. due 5 years hence, what is the rate per cent. per annum simple interest?

4. The following rule for finding the distance of the horizon is very nearly correct :—Take the number of feet in the height of the station above the level of the sea, and increase it by half that number, the square root of this quantity will give the distance of the horizon in miles. Hence find to one place of decimals the distance of the horizon from the top of Kanchinjinga, whose height is 28,156 feet. Find also the height of another mountain 350 miles from Kanchinjinga, in order that its top may be just visible from that of the latter.

5. A man invests half his capital in the 2½ per cents. at 88, and the other half in 4 per cents. at 116, and his total income from both sources is £642. What was this capital?
(Brokerage may be neglected.)

Music.

1. Write in figures over the following the value (as one pulse, ½ pulse, 1 and ½, etc.) of each note and rest :—

m .,s	:f .l	:s,l.s,f	m	:- .r	:d .	}
.r	:m .f,m	:r .d	s	:—	:- .	‖

2. Write the time names (as *taa*, or *taa-tai*, etc.) of the following pulses :—

(1) | l .l :l ‖ (2) | l:— ‖ (3) | :l ‖ (4) | l :- .l ‖
(5) l .,l :l .l.l ‖ (6) | l,l .l,l :l ‖

3. Re-write the following six measures, halving the value of each note and rest :—

(1) | m :- .r | d : (2) | s :- .f | f .m :r
(3) | r :m.f | s :— ‖ (4) | f :m.r | m :d
(5) | :d' | t :l (6) | s :-.r | m : ‖

4. Note tests for Division II. in schools include :—
A passage introducing the tones of the Doh *chord in* ANY ORDER, *and the other tones of the scale in* STEPWISE *succession.*
Write a passage of about twenty notes (without time) in accordance with these requirements.

5. State the meanings of the following terms :—(1) Lento ; (2) Rallentando ; (3) Legato ; (4) Dolce.

English.

1. Analyse—
(*a*) 'Sir Roger, observing .... us our fortunes.'—('Sir Roger and the Gipsies.')
Parse in same passage—observing, new, would, should, us.
(*b*) *Œnone.* Analyse lines 204–211.
Parse in same passage—my, that, all, from, high, low.

2. Comment on—
(*a*) 'Cassandra of the crew' — palmistry — coxcomb — Monsieur Bayle—Mr. Boyle—Saracen's Head—Guelphs and Ghibellines—Whigs and Tories.
(*b*) *Œnone :* Hesperian gold—light-footed Iris—walls rose slowly to a music slowly breathed—the foam-bow—commeasure perfect freedom—wild Cassandra—a fruit of pure Hesperian gold.

3. Write a short essay explaining and comparing the addition made to our language during Norman-French and Renaissance periods.

Geography.

1. Describe the political division of the part of Africa immediately to the north of the Gulf of Guinea.
2. Describe the physical features of the part of Africa to the South of the Orange River.
3. Where and for what are the following places noted—Agulhas, Mozambique, Loando, Sofala, Suakin, Lewah, Beira?

History.

1. The Long Parliament had been thrice partially or wholly dispersed before its dissolution in 1659. Explain this.
2. What do you understand by the 'Clarendon Code of the Cavalier Parliament"? Explain the causes and effect of this Code.
3. What do you understand by 'the rise of the Personal Monarchy?'
4. Give cause and effect of the passing of the 'Navigation Act' of 1652.

MEN ONLY.

Algebra.

1. Find the square root of—
$$(x^2-a^2)^2+(2ax-x^2)(2ax-a^2), \text{ and}$$
prove that $\dfrac{\sqrt{5+2\sqrt{6}}+\sqrt{5-2\sqrt{6}}}{\sqrt{5+2\sqrt{6}}-\sqrt{5-2\sqrt{6}}}=\frac{1}{2}\sqrt{6}$

2. Solve the equations :—
(1) $\dfrac{7x-9}{20}-\dfrac{9x-7}{14}=\dfrac{5x-3}{16}-4.$
(2) $17x^2+19x-1848=0.$

3. A man looks at his watch and, mistaking the hands, thinks time to be 55 minutes earlier than it is. Find the real time, which is between 3 and 4.

4. Insert a given number of arithmetic means between two given quantities. Find the series in A.P. in which the 5th term is 1, and the 30th term is — 74.

5. Find the sum of n terms in geometrical progression when the first term and the common ratio are given. Sum to infinity $5-4\frac{1}{2}+4\frac{1}{20}-3\frac{37}{160}\ldots$.

6. Form the equation whose roots are ¾, ⅓. Show that the sum of the squares of the roots of $x^2-(1+a)x+\frac{1}{2}(1+a+a^2)=0$ is equal to a ; and find the sum of the cubes of the roots.

Geometry.

1. Triangles upon equal bases and between the same parallels are equal to one another. PQR is a triangle : find points S, T in PQ and PR respectively such that the triangles PST, RST, and QSR may all be equal to each other.

2. In any right-angled triangle, the square which is described upon the side subtending the right angle is equal to the squares described upon the sides which contain the right angle. From S, the middle point of QR, ST is drawn perpendicular to PR, the hypothenuse of the right-angled triangle PQR. Show that the difference of the squares on PT, TR is equal to the square on PQ.

3. Why cannot we satisfactorily demonstrate the propositions of the second book concerning rectangles and their properties by means of algebraical processes? If there be two straight lines, one of which is divided into any number of parts, the rectangle contained by the two straight lines is equal to the rectangles contained by the undivided line, and the several parts of the divided line.

4. If a straight line be divided into any two parts, the squares on the whole line and on one of the parts are equal to twice the rectangle contained by the whole and that part, together with the square on the other part. In the triangle PQR the angles at Q and R are equal, and QS is perpendicular to PR. Show that the square on QR is double the rectangle contained by PR, SR.

5. Enunciate propositions 12 and 13 of the second book, and by means of them prove the following theorem. In every triangle, the sum of the squares on two of the sides is equal to twice the square on half the base, together with twice the square on the line drawn from the vertex to the middle point of the base.

WOMEN ONLY.

Needlework.

Draw on sectional paper the pattern of an infant's shirt, and give full directions for making up.

Domestic Economy.

1. What are the component gaseous elements in water, and in what proportions are they mixed?

2. Name all necessary apparatus and appliances for (*a*) laundry work, (*b*) simple cookery, (*c*) fire-place cleaning.

3. If a family can afford meat only twice a week, what is the best and most economical food to be recommended on other days?

4. State the proportions of strength-giving, flesh-repairing, and mineral food necessary to the health of a person leading an active life. What parts of the common diet of the working classes fall respectively into each of these three classes?

5. Say how far each of the following may be useful or objectionable in laundry work:—Borax, soap, hot water, lukewarm water, soda, bran, and ox gall. How would you remove inkstains, paint, tar, and grease from clothing?

6. How would you test the goodness of an egg, of milk, of fresh meat, of salt meat, and of bacon?

7. Compare the constituents, and explain the relative values of these drinks:—Coffee, cocoa, tea, ale, and whisky. Point out any risks that you believe to be connected with the use of any of them.

8. Explain fully why mischief should ensue (*a*) from not airing bed-clothes daily; and (*b*) from not properly airing under-clothing.

OR,

Geometry.

The only signs allowed are + and =. The square on PQ may be written 'sq. on PQ,' and the rectangle contained by PQ, and RS, 'rect. PQ, RS'; other abbreviations, if employed, must not be ambiguous.

1. From a given point to draw a straight line equal to a given straight line. When the given point is neither in the given line nor in it produced, in what different ways may the straight line be drawn?

2. If two straight lines cut one another, the vertical, or opposite angles shall be equal. From two given points on the same side of a given line, draw two lines which shall meet in that line and make equal angles with it.

3. At a given point in a given straight line, to make a rectilineal angle equal to a given rectilineal angle. Construct a triangle, having given one side, an adjacent angle, and the sum or difference of the other two sides.

SECOND YEAR.

Penmanship.
Dictation.
Composition.
Geography.
History.
Arithmetic.
Music.
} As First Year.

School Management.

1. (*a*) In the Class Registers, how will you ensure the *correctness* of (i.) the number entered at every meeting at the foot of the attendance columns? (ii.) of the 'total attendances' of the week, and of the quarter? How would you deal with the registration of scholars who come too late to be marked in the registers? How would you mark holidays, and days devoted to Examinations in Religious Knowledge?

(*b*) (i.) If the school attendance is irregular, describe in what form you could, from the registers, draw up a statement to put this irregularity in a striking light. (ii.) How do you find the 'average number of times attended per week by each child present at all'? and of what use is this number? (iii.) How would you record *punctual* attendance? (iv.) Why would you write up the daily attendance in view of the school?

2. What are the 'Class subjects' recognised in the Education Code? State what are the exact requirements for any two of them in Standards IV. and V.

3. Write full notes of a lesson on these subjects:—(*a*) The Spanish Armada; (*b*) the art of printing; (*c*) (for infants) the parts of a house.

4. Describe fully the process which goes on when we *perceive* an object; and explain, as to a class of Sixth Standard children, the nature and structure of the organ of sight.

5. What is understood by a proposition, a premiss, a conclusion, and a syllogism? Give an example of each.

6. Assuming the truth of the statement that (i.) if *A* is *B*, *C* is *D*, say what inference, if any, can be drawn from each of the following further statements:—(ii.) But *A* is *B*; (iii.) but *A* is not *B*; (iv.) but *C* is *D*; but *C* is not *D*. If in any of the cases no inference can be drawn, give the reason. Illustrate your answer by examples.

English.

1. Explain the 'loss of Portia's ring,' and also 'Antonio's position when asking Shylock for a loan.'

2. In *Macbeth*.—Under what circumstances were the following phrases used?—

'Wouldst not play false,
And yet wouldst wrongly win.'

''If it were done, when 'tis done, then 'twere well
It were done quickly.'

'I dare do all that may become a man;
Who dares do more is none.'

'Wherefore could I not pronounce Amen.'

'We have scotched the snake, not killed it—canst thou not minister to a mind diseased?'

3. Comment on:—

'Groaned for the Roman legions here again'—'A doubtful throne is ice on summer seas'—Mage Merlin—'riddling triplets of old time,'—'the high saint'—'cuckoo chased by lesser fowl.'

MEN ONLY.

Algebra.

1. All of First Year.

2. What is the rule for writing down the characteristic of the logarithm of any number to the base 10? Prove that

$$\log \frac{1}{m} = -\log m.$$

Show that $3 \log \frac{81}{80} + 5 \log \frac{25}{24} + 7 \log \frac{16}{15} = \log 2.$

3. Find the formula for the present value of a given sum due at the end of a given time at a given rate, (1) at simple, (2) at compound, interest.

4. Show how any proposed number may be expressed in a given scale of notation. Transform 4321 from the quinary to the septenary scale.

5. Solve the equations:—

(1) $\sqrt{x^2+10x+5} = \sqrt{5x+4} + \sqrt{5x-4}$.

(2) $\begin{cases} 4(x^3+y^3) = a^3+3a^2 \\ x+y = a. \end{cases}$

6. Two passengers have together 600 lbs. of luggage, and are charged for the excess above the weight allowed 3s. 4d. and 11s. 8d. respectively. If all the luggage had belonged to one of them he would have been charged £1. How much luggage is each passenger allowed free of charge?

7. Find the radius of a sphere whose volume is 6558·552 cubic feet.

Geometry.

1. All of First Year.

2. To describe a circle about a given triangle. If two circles be described, one about, the other within, a right-angled triangle, the sum of their diameters is equal to the sum of the sides containing the right angle.

3. To describe a circle about a given equilateral and equiangular pentagon. If the pentagon be PQRST, show that PR is parallel to ST.

4. When is the first of four magnitudes said to have the same ratio to the second which the third has to the fourth? What is meant by 'homologous sides'? If a straight line be drawn parallel to one of the sides of a triangle, it shall cut the other sides, or these produced, proportionally; and conversely, if the sides, or the sides produced, be cut proportionally, the straight line which joins the points of section shall be parallel to the remaining side of the triangle.

5. To find a mean proportional between two given straight lines. From a point P, outside a circle, a line is drawn cutting the circle at Q and R. Find a mean proportional between PQ and PR.

6. P and Q are fixed points on a given circle; PR, QS are any pair of chords equally inclined to PQ. Show that the *direction* of RS is fixed.

WOMEN ONLY.

Needlework.

Make up the given calico in form of the front opening of a woman's nightdress.

Work a button-hole, and show at least three inches of stitching and feather stitching.

Domestic Economy.

1. 'High interest,' it has been said, 'is only another name for bad security.' Explain this, and give examples of some forms of investment for savings which a prudent person should avoid.
2. An invalid is advised to abstain for a while as far as possible from nitrogenous food. What diet is best suited for such a person, and why?
3. Name the principal disinfectants, and explain in what way to use them.

OR,

Geometry.

1. As First Year.
2. Questions (1) and (2) from Men's Geometry, First Year.

SYLLABUS OF WORK FOR THE MONTH.

Students are advised not only to get up the work indicated, but also to use the test questions as indications of work to be got up and afterwards written out.

FIRST YEAR.

School Management.

1. The senses, and methods of training.
2. Object lessons—uses and abuses.
3. The place of literature in a school curriculum.
4. Kindergarten—uses—limits.

Composition.

1. Times of Shakespeare.
2. Comparison of Tennyson and Gray.
3. Arthur.
4. Lady Macbeth.

Arithmetic.

Not less than six examples from miscellaneous sets ought to be worked per week, as well as those on the particular work set and the examination questions given.

1. Examination papers, 29–42, P.
   Theory of rules in fractions.
2. Examination papers, 43–56, P.
   Theory of rules in decimals.
3. Examination papers, 57–70, P.
   Theory of simple subtraction.
4. Examination papers, 71–84, P.
   Theory of H.C.F. and L.C.M. of fractions.

Music.

1. Compass of Boys' and Girls' voices.
2. Voice training, especially the upper register.
3. Music terms.
4. Measures of various pulses.

English.

1. Syntax of Pronoun.
2. Norman-French influence.
3. Syntax of Verb.
4. Characteristics of Latin and English elements.

Literature.

1. Mischief of Party spirit.
2. Duke of Wellington.
3. Sir Roger and the Gipsies.
4. 'The Brook.'

Geography.

1. Congo Basin.
2. Nile Region.
3. African Islands.
4. Zambesi Region.

N.B.—Messrs. Macmillan have published a Geography of Africa, which all students will do well to look carefully through.

History.

1. Henry VII.
   Washington—Grenville—Wilkes.
2. War of American Independence (causes—events—results).
   Erasmus—New Learning—More.
3. Henry VIII.
   Clive—Hastings—Rockingham.
4. Grenville Ministry.
   Wolsey—Cromwell—Latimer.

MEN ONLY.

Algebra.

1. Theory of equations (proofs, etc.).
2. ,, progressions (proofs, etc.).
3. ,, H.C.F. and L.C.M.
4. ,, ratio—proportion—variation.

Geometry.

1. Book I. 37–43.
   ,, II. 5 and 13.
   ,, III. 13–16.
2. Book I. 44–48.
   ,, II. 6 and 14.
   ,, III. 17–19.
3. Book I.—Definitions—Postulates—Axioms.
   ,, II. 7 and 2.
   ,, III. 20–22.
4. Book I. 4, 7, 18, 35, 42, 48.
   ,, II. 9 and 4.
   ,, III. 23–25.

N.B.—At least THREE riders should be done every day. Do not spend more than 15 minutes over any rider at one sitting.

WOMEN ONLY.

Needlework.

All stitches of woman's chemise.

Domestic Economy.

1. Ventilation.
2. Respiration.
3. Digestion.
4. Warming and cleaning house.

OR,

Geometry.

Revise Definitions and Postulates.
,, Prop. 11–16 and riders thereon.

SECOND YEAR.

Composition.
Music.
Arithmetic.
Geography.
History.
} As First Year.

School Management.

1. First two weeks of First Year.
   Fallacies.
2. Fitch, V.
   Educational aims.
3. Second two weeks of First Year.
   Moods and figures.
4. Fitch, VII.
   Order of development of child mind and suitable exercises.

English.

1. First two weeks of First Year.
   'Merchant of Venice,' Act III.
2. 'Coming of Arthur,' 101–200.
3. Second two weeks of First Year.
   'Macbeth,' Act III.
4. 'Passing of Arthur,' 101–200.

MEN ONLY.

Algebra.

1. First two weeks of First Year.
2. Permutations and Combinations (proofs).
3. Second two weeks of First Year.
4. Binomial Theorem (proof).

Geometry.

1. First two weeks of First Year.
2. Book IV. 14, Book VI. 23, and revise 1.
   Definitions of Book V.
3. Second two weeks of First Year.
4. Book IV. 15, Book VI. 24, and revise 2.
   Definitions of Book V.

WOMEN ONLY.

Needlework.

As First Year.
All stitches in muslin pinafore.
Whipping.

Domestic Economy.

1. First two weeks of First Year.
2. Investments and Savings.
3. Second two weeks of First Year.
4. Care of and cooking for sick, and symptoms of diseases.

OR,

Geometry.

As First Year.
Propositions 26, 29, 35, 38, 42.

THE INSPECTOR'S NOTE-BOOK.

BY AN INSPECTOR OF SCHOOLS.

PRIMARY TEACHERS AND DEGREES.

'As full of spirit as the month of May.'
(*Henry IV.*, Act iv. Sc. i.)

'To climb steep hills requires slow pace at first' (*Henry VIII.*). I do not suppose that the status of any profession has made such rapid strides during the past ten years as has that of Elementary School teachers. The last decade has seen the inauguration of Day Training Colleges and the University Correspondence College. It would be interesting to learn how many of the 3,535 University Correspondence College students who have passed London University Examinations since 1891 are Primary School teachers. There is not the slightest doubt that a very large proportion are.

* * * * * *

The tendency of the times. It is of University Education for teachers that I propose to write this month. The day is fast approaching, if it has not already arrived, when the possession of a degree will be a necessary qualification for the mastership of an average Board School. Not two months ago a man with a degree was selected for a Board School headship, salary £200. Five out of six chosen to be interviewed by the Board were men with a University degree. Need one say more to make those entering the profession realise the tendency of events? Every student at the training colleges should seriously consider the possibility of taking University courses in lieu of part of the Certificate course.

* * * * * *

'En avant!' My advice to aspirants to the hood and gown is to break the back of the business, if possible, whilst at college. Although many have by dogged perseverance obtained a degree, starting after leaving college, yet none but they know how heavy was the price paid for the honour. It is a mistake for teachers to be content with obtaining the Certificate. Steady reading keeps one fresh mentally, and will not affect one's health injuriously. Moreover, as the Persian proverb hath it, 'The stone ready for the wall lieth not long in the road,' which being interpreted into commercial English, 'Equip yourself for advancement and you will obtain it.'

* * * * * *

What are the available sources? Let us now consider the facilities open to those desiring to graduate. In the first place, of course, Queen's Scholars may, by attaching themselves to a Day Training College at one of the English or Welsh Universities, graduate and obtain the Certificate concurrently, although to do this I believe one must stop three years. Secondly, for all those Queen's Scholars at the Residential Colleges, the only available Universities are Dublin Trinity College, the Royal Irish, and London. These also are the available places for all other teachers excepting those few who live within the boroughs of a University town. Those, however, desirous of graduating in Music are not compelled by the authorities of the Residential Universities to live inside the boundary, so that a man teaching at Plymouth, say, could whilst pursuing his vocation graduate as a Mus. Bac. at Durham or Cambridge, but not as a B.A.

* * * * * *

Arts and Science are the popular faculties. Of the various faculties in which degrees are granted, the Arts and Science commend themselves most to the primary teacher. I should, however, recommend all who are good musicians to reconnoitre the faculty of Music. If London be found too difficult, investigate the Durham and Cambridge stipulations. With thus much, I will proceed to Arts and Science as interesting a greater number. London being the most popular, although not the easiest, we will take it first. To obtain the B.A. or B.Sc. degree there, it is necessary to pass three examinations. First, the B.A.:—(1) Matriculation, (2) Intermediate Examination in Arts, (3) Final Examination in Arts. For the Matriculation it is necessary to pass at one and the same examination in: (1) Latin, (2) One other language, for instance French, (3) English, including a little History, (4) Mathematics, (5) Mechanics, (6) One Science, *e.g.* Chemistry.

* * * * * *

The London B.A. course in brief. After passing the Matriculation Examination the student in Arts continues his Latin, French, English, and Mathematics further, takes on board Greek, and drops Mechanics and Science. Full information respecting the details are procurable from the Regulations, sent free on application to the Registrar, London University, Burlington Gardens, London. Then comes the final heat, wherein Latin and Greek are compulsory, and in addition the undergraduate must come up for (A) English *or* French, *or* German *or* History, and (B) Pure *or* Mixed Mathematics, *or* Mental and Moral Science.

* * * * * *

The Science degree. The B.Sc. is becoming a much sought-after degree as well. Teachers working in Higher Grade and Organised Science Schools find it useful when looking for advancement. To obtain this prize there are also three examinations: (1) Matriculation, (2) Intermediate Examination in Science, (3) Final B.Sc. Examination. To the first we have referred. The Intermediate Science Examination comprises the following subjects: (1) Chemistry (theory and practice), (2) Biology, with practical work, (3) Experimental Physics, with practical work, (4) Pure and Mixed Mathematics. The B.Sc. Examination—It is necessary to present one's-self for examination in any three of the following subjects: (1) Pure Mathematics, (2) Mixed Mathematics, (3) Physics, (4) Chemistry, (5) Botany, (6) Zoology, (7) Animal Physiology, (8) Physical Geography and Geology, (9) Mental and Moral Science.

* * * * * *

The chief obstacles. Any first-class certificated teacher could with twelve months' steady work prepare for the Matriculation Examination. The two greatest difficulties generally found with the above are (1) the Greek in the B.A. course, (2) Biology in the B.Sc. course. The latter difficulty is due to the impossiblity, except in large centres, of getting laboratory practice. Very few can do the Biology without help. Any provincial man who really means to get the degree can overcome this difficulty by spending his vacations in London and joining classes. To all teachers at work in school studying for a degree I would say, most certainly procure help. The journey is too toilsome without it. If you are weak in classics, go to an Oxford or Cambridge classical honoursman for a course of twenty lessons. He will let the light into the subject for you. Then take on a correspondence course. If possible, read the authors with your coach. You will never regret it.

* * * * * *

The Log Book. There seems to be much difference of opinion as to what should and what should not be inscribed in a Log Book. I could, if it were appropriate, furnish some choice extracts from ancient and modern pages of the school log. It is not intended to be a record of meteorological observations, excepting, of course, inasmuch as they especially affect the school. 'No reflections or opinions of a general character are to be entered.' Teachers desirous of bearing testimony to the excessive urbanity or undue severity of Government officials or school managers should remember this injunction forming the foot-note to Art. 8. Most often one finds too little written in the Log Book. One would like to see fuller accounts of the progress of the work recorded. It should be a brief history of the school and its *entourage*. It will not be out of place to indicate a few of the things which might be included, in addition to the

important items such as the copies of reports: (1) Changes in the staff, with dates, (2) Holidays, (3) Change in the time-table, (4) List of recitations, songs and object lessons, (5) Lateness of members of the staff and absences of same, (6) Difficulties with parents or insubordination of junior teachers, (7) Notification of visit of any official or manager when such person has not signed his name.

Answers to Correspondents.

W. B. S. writes to me to know whether there are sufficient teachers desirous of using the chemical and physical laboratories of places like the Yorkshire College, Leeds, to make the opening of such every evening and during vacation pay. He says: 'The great weakness of our Science Teaching is the want of practical knowledge on the part of the teachers, and twelve hours a week for a couple of years in the laboratories would go far to removing this.' I agree with 'W. B. S.' Even less than twelve hours a week might accomplish this end. The question is a very practical one for teachers, though I am sorry I could not tell him how many in any particular town want to use laboratories. Could he not ascertain from someone on the spot—an official of the N.U.T., for instance?

H. G. has passed the Scholarship, and wants to know whether his indentures are thereby cancelled.—No. You are not an ex-pupil teacher until your apprenticeship is ended, even if you graduated at a university before that time. Your salary was settled, or should have been, by agreement until June 30th, 1897. You cannot claim an advance until July 1st therefore.

Communications for this column should be addressed Inspector, c/o The Editor, 33, Paternoster Row.

We have arranged for a special article on the subject of Preparation for the London Matriculation to appear next month. If a sufficient number of our readers are desirous of taking up the London Matriculation, it is our intention to start a Course in July for the June 1898 Examination. In this Course all the subjects will be covered, and special attention will be paid to Latin grammar and composition. Students, therefore, who desire this addition to the Tutorial Section would oblige by communicating with the Editor forthwith.

QUERY COLUMN.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the *coupon* which appears on the back wrapper of the current number of the Journal.
3. Correspondents must in all cases state the source from which their query has been obtained.

The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Hodie.—A man walks from Cambridge to Newmarket and back at a uniform rate, but having looked at a clock at Newmarket which is 15 minutes slow, he thinks he has gone at the rate of $4\frac{4}{17}$ miles an hour, and returned at the rate of $3\frac{1}{13}$ miles an hour. Determine his rate of walking, and the distance from Newmarket to Cambridge.

Let the distance from Cambridge to Newmarket be x miles.

He has walked from Cambridge to Newmarket, as he thinks, at the rate of 1 mile in $\frac{17}{72}$ hours.

He thinks it has taken him $(x \times \frac{17}{72})$ hours to walk from Cambridge to Newmarket; and $(x \times \frac{13}{52})$ hours from Newmarket to Cambridge.

However much the clock at Newmarket may be slow, there is no doubt that he has walked there and back, $2x$ miles, in $[x \times \frac{13}{52} + x \times \frac{17}{72}]$ hours, or at the rate of 1 mile in $\frac{4}{65}$ hours, viz., 4 miles an hour.

Now he has walked from Newmarket to Cambridge in $x \times \frac{1}{4}$ hours. He thinks it has taken him $x \times \frac{1}{52}$ hours, or $\frac{x}{56}$ hours longer. This is because the clock at Newmarket is $\frac{1}{4}$ hour slow.

Hence $\frac{x}{56} = \frac{1}{4}$, or $x = 14$ miles.

Student.—Two trains start at the same time from two termini to meet each other. After passing each other, they arrive each at the station of the other in $5\frac{1}{4}$ and 9 hours respectively. If the former travel 45 miles an hour, how fast does the latter travel?

Suppose a map of the route drawn, with A, B, as the two termini, and Z the point where the trains meet, Z being nearer to B than A.

A ——— Z ——— B

The first train goes from Z to B in $5\frac{1}{4}$ hours, hence $ZB = 45 \times 5\frac{1}{4}$ miles.

If the second train is going at x miles an hour, then, similarly, $ZA = x \times 9$ miles.

But the distances AZ, BZ, are proportional to the speeds of the x trains, since they start at the same time. That is—

$$ZA : ZB :: 45 : x.$$

$$\therefore x = \frac{45 \times ZB}{ZA} = \frac{45 \times (45 \times 5\frac{1}{4})}{x \times 9},$$

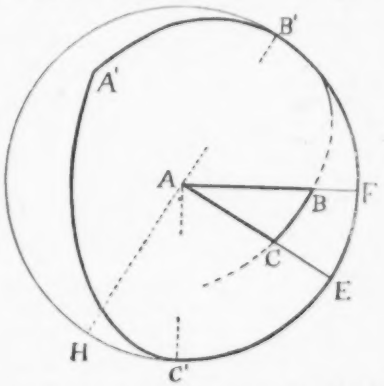
$$\text{or } x^2 = \frac{45 \times 45 \times 36}{9 \times 7} = \frac{45 \times 45 \times 4}{7}.$$

$$\therefore x = \frac{45 \times 2}{\sqrt{7}} = \frac{90\sqrt{7}}{7} \text{ miles per hour.}$$

T. Smith.—When $n + 2$ figures of a cube root have been found, show how the remaining n figures may be determined without going through the ordinary process, the entire number containing $2n + 2$ figures.

This is explained in Todhunter's 'Algebra'; see Art. 257 in the chapter on Evolution.

Pedro.—You do not appear to have clear notions on the relations between the angles and sides of the primitive triangle and those of the polar triangle. In the figure a spherical triangle ABC is shown. You will observe that AB, AC, are purposely shown as straight lines. Well, you must satisfy yourself that it is always possible to take a view of a spherical triangle such that two sides *appear* as straight lines (by looking along the diameter through A).



Now there are two poles of the great circle of which AB is an arc, but it is usual to take that one, C', which lies on the same side of AB as C. Similarly A' and B' are the poles of the great circles containing the arcs BC and AC respectively; thus ABC is the primitive, and A'B'C' is its polar triangle. It must be obvious to you, from the figure, that the angles of A'B'C' are not equal to corresponding angles of ABC. The fundamental relations between the sides and angles of these triangles are what you should be clear about, namely,

$$a = \pi - A', \; b = \pi - B', \; c = \pi - C'.$$
$$A = \pi - a', \; B = \pi - b', \; C = \pi - c'.$$

We will establish one of these, namely, $A = \pi - a'$; the others may be similarly obtained.

The side a' is the arc B'EFC', and the angle A is measured by the arc EF. But EF and B'FC' make up a semicircle because EF = C'H, therefore $A = \pi - a'$.

Now it follows from these relations that if

$$\cos a = \cos b \cos c + \sin b \sin c \cos A,$$

then $\cos(\pi - A') = \cos(\pi - B')\cos(\pi - C') + \sin(\pi - B')$
$\sin(\pi - C')\cos(\pi - a')$,

or $-\cos A' = (-\cos B')(-\cos C') + \sin B' \sin C'$
$(-\cos a')$,

$$\text{or } -\cos A' = \cos B' \cos C' - \sin B' \sin C' \cos a',$$
$$\text{or } \cos a' = \frac{\cos A' + \cos B' . \cos C'}{\sin B' \sin C'}.$$

But since this is true for any spherical triangle, it is true for the primitive triangle, and hence

$$\cos a = \frac{\cos A + \cos B . \cos C}{\sin B . \sin C}.$$

'*Well-Wisher*,' *Southport.*—We have recently arranged for an extension of the Tutorial Section in the way you kindly suggest.

*** Replies to several queries are held over in consequence of non-compliance with Rule 3.

CIRCULAR TO H.M. INSPECTORS.

Very Backward Children in Schools for Older Scholars. Circular 395.

EDUCATION DEPARTMENT,
WHITEHALL, LONDON, S.W.
12th April 1897.

SIR,—In a considerable number of the larger schools for boys and girls there are found groups of children, some of whom are nearly ten years of age, who at the time of their admission were almost wholly ignorant and quite without school habits.

Among the causes for this deplorable state of things may be named, total neglect or irregularity of school attendance in early childhood; the migratory character of some families and their consequent evasion of the Attendance Officer; an abnormally slow development of intellectual power, in some cases bordering on imbecility; and delicacy of health in early childhood, due often to bad nutrition. There are also a few children with slight epileptic tendencies; and a small number are crippled or paralysed. These classes of children cannot generally be taught with ordinary scholars capable of passing through the First Standard in the course of a year, except at the cost of very great anxiety on the part of the teachers and some strain upon the school organisation; whenever this is attempted educational progress is imperfect and slow; and, not seldom, the habit of truancy is the result.

These children are, as a rule, of a mental type above that suited to the special classes for those of defective intellect, from which classes the large majority of them should be excluded.

Separate organisation, therefore, is required for their instruction and training: the same organisation, however, will probably not be suited to all schools. You should, therefore, point out to the Managers the desirability of adopting, according to circumstances, one of three following plans *in all cases in which it is thought that the number of these very backward children is insufficient to justify the employment of an additional teacher in their own school*:—

(*a.*) The establishment of a separate preparatory mixed class of boys and girls in a class-room of its own;—this class should be, if possible, connected with the girls' department, and should be in the hands of a teacher specially skilled in training older infants, and she should be authorised to exclude all such boys as she finds beyond her power of control.

(*b.*) The infant mistress may be made responsible for the instruction and training of these children in her school; the right being reserved to her to refuse any boys whom she may deem unsuitable companions for her infants. These children should, if possible, be formed into a special class of the infant school, and should in no case be drafted into either of the lowest two classes.

(*c.*) In a small number of schools the reorganisation of the staff of the boys' and girls' departments, coupled with the reclassification of the children, might enable the Managers to devote the entire service of one teacher to such a class. So far as the rules of the Department and the Code are concerned, a school may be organised for this purpose on lines which, whilst following generally the curriculum included under the ordinary Standards, do not necessarily aim at covering exactly in any one year the limits laid down by any one Standard, but which seek to reach by different stages the same ultimate educational level as that covered by Schedule I. of the Code.

Unless some one of the above suggested plans, or some plan equally efficient for the instruction of very backward scholars, is adopted, it will be your duty to recommend the lower Discipline and Organisation Grant; and in some cases it may be necessary, after due warning, to withhold that Grant altogether.

I have the honour to be, Sir,
Your obedient Servant,
G. W. KEKEWICH.

To ———
H.M. Inspector of Schools.

LEAVING CERTIFICATE, 1897.

CIRCULAR 204.

Scotch Education Department,
1st April, 1897.

SIR,

I am directed to remind you that the examination for Leaving Certificates will begin on Monday, the 14th June, and I am to give the following further particulars with respect to it:—

In a few weeks, my Lords will issue a form on which they will ask for exact information as to the numbers to be examined in the various grades of each subject.

[It is of the utmost importance that this form (H. (1)) should be returned to the Department without delay.]

Candidates must be pupils of the school at which, or in connexion with which, they are examined, and must have been in regular attendance from January to the date of the examination. They may be presented in any grade of any subject. In no case does the result of examination in a paper taken in a previous year affect the examination.

The following subjects will be included in the Examination:—English (including questions on Modern History and Geography), Latin, Greek, French, German, Mathematics (including Arithmetic), and Book-keeping with Commercial Arithmetic.

If the authorities of any school should desire to present pupils in any other Modern Language, early intimation should be sent to the Department.

Certificates of three Grades—Lower, Higher, and Honours—will be given in each of these subjects except Book-keeping and Commercial Arithmetic, where one grade of certificate will only be given.

For information as to the arrangement of the papers and the character of the questions in Mathematics, I am to call your attention to the Note as to Mathematical Papers. I am also to call your attention to the Note as to Papers in English and the Memorandum as to Papers in Modern Languages. Copies of these Notes have already been sent to you.

As on previous occasions, the examination will be general and not in prescribed books. In the English papers, where this might operate unfairly, my Lords will endeavour to meet the difficulty by giving a considerable choice of questions in History, Literature, and Geography. Such an amount of knowledge as will enable a candidate to answer a sufficient number of the questions set in History and Geography may be expected from every pupil, and candidates in the Lower and Higher Grades will be required to satisfy the examiners that they possess a competent knowledge of at least one of these subjects. Candidates in the Honours Grade will be at liberty to answer any of the questions set in the First Paper (Higher Grade Paper) in History and Geography, and the marks obtained will be allowed to count towards the number required to obtain a pass.

My Lords have noticed, with regret, that a large number of candidates are presented in a grade higher than their attainments warrant, and thus the number of failures is considerably increased. They are of opinion that candidates should not be presented in a grade higher than that in which they are likely to pass, and they fear that the issue of certificates, in certain cases, in a lower grade than that in which candidates are presented, has, to some extent, encouraged the practice. They will not at present withdraw this concession; but they desire to give notice that a certificate of a lower grade will, in such cases, be issued only to a very limited extent. Their Lordships will be unable to issue a Lower Grade Certificate in any subject to candidates who take papers in the Honours Grade and fail to qualify for a Certificate in the Higher or Honours Grade. In Mathematics a certificate will in no case be awarded in a lower grade than that in which the candidate is presented.

In Latin, Greek, French, German, and English, two papers will be required in the Honours Grade. In Book-keeping and Commercial Arithmetic, separate papers will be set, but a Certificate will be granted to those candidates only who pass in both branches.

The examination will take place simultaneously in each school, beginning on Monday, June 14. The subjects will be taken in the following order:—

Monday, June 14th	10 a.m.	Arithmetic.
" " "	12 noon.	Geometry.
" " "	3 p.m.	Algebra.
Tuesday, June 15th	10 a.m.	English.
" " "	2 p.m.	German.
Wednesday, June 16th	10 a.m.	French.
" " "	2 p.m.	Greek or Book-keeping.
Thursday, June 17th	10 a.m.	Latin.
" " "	2 p.m.	Greek (2nd honours paper) or Commercial Arithmetic.

Friday, June 18th	10 a.m.	Trigonometry and Logarithms.*
,, ,, ,,	12 noon.	Analytical Geometry.
,, ,, ,,	2 p.m.	Dynamics.
,, ,, ,,	4 p.m.	Geometrical Conics.
Monday, June 21st	10 a.m.	English (2nd honours paper).
,, ,, ,,	2 p.m.	Latin (2nd honours paper).
Tuesday, June 22nd	10 a.m.	French (2nd honours paper).
,, ,, ,,	2 p.m.	German (2nd honours paper).

* The use of a book of Mathematical Tables is allowed, provided it contains no manuscript notes or printed matter other than such as refers to the use of the Tables. Each candidate should be provided with a separate book.

On each occasion, the papers for the Lower Grade, the Higher Grade, and the Honours Grade Certificate in each subject will be set simultaneously. The time allowed, except where otherwise stated, for each paper in Languages and English will be two hours and a half in the Lower Grade, and three hours in the Higher and Honours Grades.

For the time allowed for the various subjects in Mathematics, you are referred to the Note as to Mathematical Papers. In previous years many candidates have failed to give the detailed work in these subjects. Candidates should be informed that in order to obtain full marks all the work must be shown.

[Candidates are recommended to write out the working very carefully in the first instance, so that a second copy may not be required and the time thus saved may be utilised for answering further questions.]

The examination will be held at the school from which candidates are presented, unless the authorities are informed to the contrary. A suitable room or rooms must be provided, also pens, ink, and blotting paper. Slates may not be used, nor pencils, except in the drawing of mathematical diagrams.

The use of scroll paper is absolutely prohibited. The rough work (if any should be necessary), as well as the fair copy, is to be written in the books, and candidates should draw their pen through the rough work.

One piece of blotting paper only should be supplied to each candidate. It must be left on the desk at the end of each sitting. *Writing of whatever kind on blotting paper is strictly forbidden.* A fresh piece may be supplied by the supervising officer to a candidate who requires it and gives up the piece first supplied.

The books in which the answers are to be written will be supplied by the Department, and will be forwarded to the Head Master a few days before the examination.

Any candidate introducing any book or note of any kind into the examination room, or detected in copying, will be instantly dismissed and the case reported to the Department.

My Lords regret that in previous years there have been several cases in which serious copying has been detected, and they desire to impress upon school authorities the importance of doing all that is possible to prevent such dishonesty. Their Lordships feel bound to deal with the practice severely, and candidates should be warned, before the examination, that a certificate will not be issued, in any subject, to a candidate in whose papers, or any one of them, indisputable evidence of copying is detected.

My Lords will appoint an officer to represent the Department at the examination. He will distribute the papers and supervise the examination. If, *in any subject*, all the candidates cannot be accommodated in one room, information must be sent to the Department before the 10th May, so that the necessary number of supervising officers may be appointed. Such supervision cannot be entrusted to anyone who does not represent the Department.

The selection of candidates from any school rests entirely with the authorities of the school, and, in regard to this, they must act on their own responsibility. At the same time, in order that this examination may form a satisfactory supplement to the inspection of the higher class schools, it is understood that, as a general rule, the pupils of the highest class, or of the highest class and that next to it in such schools should be presented. It is undesirable, if the examination is to serve as a test of the real merits of a school and the scope of its curriculum, that the candidates should be confined only to a few selected pupils. But, having indicated this view, my Lords do not desire to lay down any strict rule which might interfere with the discretion of the managers.

In the case of candidates who desire to qualify by this examination for exemption from examinations of the University of Oxford, or the University of Cambridge, it is essential that notice should previously be given to this Department, and a list of the names of such candidates must be furnished on a form for this purpose, which may be obtained on application to the Department. If, subsequently, candidates should determine not to proceed to either University, notice must be given *before* the 26th July. In the absence of such notice, the papers will be sent to the Schools' Examination Board, and the ordinary fee will fall to be paid to that Board.

In regard to their Lordships' Circular (No. 200) of the 7th December last, sent to State-aided schools, I am to explain that, while my Lords are unable to hold an examination at, or in connexion with, a school from which candidates are presented only in Arithmetic and English of the Lower Grade, this rule will not preclude pupils of a school from being presented in these subjects only, in cases where some of the candidates are presented in one or more of the higher subjects of education and where my Lords have agreed to hold an examination.

I have the honour to be, Sir,

Your obedient Servant,

H. CRAIK.

Letters should be addressed—'The Secretary, Scotch Education Department, Dover House, Whitehall, London, S.W.'

OUR FRENCH PRIZE COMPETITION.

Prize Editor.—W. T. THOMPSON, B.A. (LOND.),

First Class French Honours.

PRIZE AWARD—APRIL.

The Prize is awarded to *Sic*, the pseudonym of

T. J. CHOWINS, Wilfrid Road, Street, Somerset.

First Class.—Pawn, C'est égal, A Scapegrace, Rien qui vaille, Celt, Turbia, Eric Brighteyes, Echo, Philosophe, An admirer of Gouin, Romola, Couleur verte, Florent Etona, Samarobriva, Sans famille, Derby, La Mayeux, Nunquam Obliviscar, Sweetbriar, Friar Tuck, Gipsy, Gwladys, Log a x, Gallia, Républicain, Viola, Black Douglas, Adamant, Nannette, Langcliffe, Girdleness, Iris, Oiseau, Jersiais, Pelican, Rhondda, Northam, Errol, Mme. Bouton, Vera, Galatea, East Anglia, Camillus, E. S., Stigand, Overnewton, Scholastica, Usus loquendi, Don, Eric, Jeannette, Auld Reekie, Beth, Pansy, Phono, Xie, Jupiter.

Second Class.—Flo, Charley's Aunt, Tryer, Friar, Ean Gras, Anglaise, Yllop, Lindum, Philosophe (2), Urbs intacta, Deerness, Anna, Renllek, Glanage, Ulysse, Observer, Olivia, Eboracum, Madelon, Cæsar, Bellona, T. R. M. M., Imsraif, A. George, Met, Wellingtonia, White Star, Patience, Pussie, Blossom, Lach-yn-gair, Ter dic, Angleterre, Babbie, Holdsworth, Gwynedd, Truda, Holmfirth, Heath, Vulcan, Veni, vidi, vici, St. Brelade, Cerdic, Oof.

Third Class.—Hope, Griffonage, Sam, De Fiva, Queen's Scholar, Improvement.

Too late for Classification.—Berwick.

A Plaisance, le 30 mai, 1804.

Nous venons de faire un empereur, et pour ma part je n'y ai pas nui. Voici l'histoire. Ce matin, d'Anthouard nous assemble, et nous dit de quoi il s'agissait, mais bonnement, sans préambule ni péroraison. Un empereur ou la république, lequel est le plus de votre goût? Comme on dit rôti ou bouilli, que voulez-vous? Sa harangue finie, nous voilà tous à nous regarder, assis en rond. Messieurs, qu'opinez-vous? Pas le mot. Personne n'ouvre la bouche. Cela dura un quart d'heure ou plus, et devenait embarrassant pour d'Anthouard et pour tout le monde, quand Maire, un jeune homme, un lieutenant que tu as pu voir, se lève et dit: S'il veut être empereur, qu'il le soit; mais, pour en dire mon avis, je ne le trouve pas bon du tout. Expliquez-vous, dit le colonel; voulez-vous, ne voulez-vous pas? Je ne le veux pas, répond Maire. Nouveau silence. On recommence à s'observer les uns les autres, comme des gens qui se voient pour la première fois. Nous y serions encore si je n'eusse pris la parole. Messieurs, dis-je, il me semble, sauf correction, que ceci ne nous regarde pas. La nation veut un empereur, est-ce à nous d'en délibérer? Ce raisonnement parut si fort, si lumineux, que j'entraînai l'assemblée. Jamais orateur n'eut un succès si complet. On se lève, on signe, on s'en va jouer au billard. Maire me disait: Ma foi, commandant, vous parlez comme Cicéron; mais pourquoi voulez-vous tant qu'il soit empereur, je vous prie? Pour en finir et faire notre partie de billard. Fallait-il rester là tout le jour? Pourquoi, vous, ne le voulez-vous pas? Je ne sais, me dit-il, mais je le croyais fait pour quelque chose de mieux. Voilà le propos du lieutenant, que je ne trouve point tant sot. En effet, que signifie, dis-moi, un homme comme lui, Bonaparte, soldat, chef d'armée, le premier capitaine du monde, vouloir qu'on l'appelle majesté. Etre Bonaparte, et se faire sire! *Il aspire à descendre;* mais non, il croit monter en s'égalant aux rois. Il aime mieux un titre qu'un nom. Pauvre homme, ses idées sont au-dessous de sa fortune. Je m'en doutai quand je le vis donner sa petite sœur à Borghèse, et croire que Borghèse lui faisait trop d'honneur.

PAUL LOUIS COURIER.

Translation.

Placencia, May 30, 1804.

We have just decided in favour of an empire, and as far as I am concerned, I have not come off so badly in the matter. It happened in this way: This morning d'Anthouard called us together, and placed before us the matter in hand very simply and without any circumlocution whatever. Much in the same way in which one is asked to decide between the claims of 'roast' or 'boiled,' so did he now call upon us to express our preference for an emperor or for a republic. When he had concluded his remarks, imagine, if you can, all of us seated in a circle, each studying the others' faces. 'What do you think about it, gentlemen?' asks d'Anthouard, but no word does he get in response to his appeal; no one so much as opens his lips. Now things continued like this for a quarter of an hour or more, and just when d'Anthouard and everyone else was beginning to feel the awkwardness of the situation, a lieutenant named Maire, a young fellow whom perhaps you may have met, broke the silence. 'If he wants to be emperor,' said he, 'let him; but to be frank, I don't think very highly of it.' 'Will you kindly explain yourself?' asks the colonel; 'Are you in favour of an emperor, or are you not?' 'I am not,' says the lieutenant, and silence is again the order of the day. And now began again that process of mutual inspection, for all the world as if we had never seen one another before. It is my belief we should be there yet, if I had not ventured to speak. 'Gentlemen,' I said, 'I am open to correction, but it seems to me that this is a matter which is quite outside our province: if the nation wishes for an emperor, is it any business of ours to debate the point?' The argument struck all present as being so forcible, and the thing now seemed so clear withal, that it met with unanimous approval. Such a complete success never before rewarded an orator; for with one accord they get up, they subscribe, and then we withdraw for our billiards. Said the lieutenant to me: 'My word, sir, but you are a very Cicero! Pray tell me, though, why you are so willing to make him emperor.' 'Oh,' I replied, 'only to have done with it, and have our game of billiards; who wanted to stay there all day? But why are you opposed to it?' 'I hardly know,' said he, 'but I always believed that he was intended for something noble.' So spake the lieutenant, and in my opinion he is not such a muff after all. For, indeed, what does it matter to a man like Buonaparte—a brilliant soldier, commander-in-chief, first of the world's great captains—that he should be called 'your majesty'? Being Buonaparte, and then being made an emperor! Why the man's ambition is to *come down a rung!* Not that he thinks so, though; preferring an empty title to the honour Fame bestows, he fondly thinks he still climbs in becoming the equal of kings. Poor man! how much meaner are his ideas than his destiny! I more than suspected as much when he married his beautiful sister to Borghèse, thinking in so doing that it was the latter who conferred the great honour.

SIC.

Both the number of competitors and the quality of the papers have improved this time. A dozen or so of the best papers were so nearly equal in merit as to render the award of the prize a very difficult matter. These candidates succeeded very well in rendering into English the freedom and ease of Courier's epistolary style. Many candidates need more extensive and varied reading in French before they can hope to stand well on the list.

Je n'y ai point nui was a puzzle to many. It means, 'I did not oppose it,' not, as some have put it, 'I lent my aid.'

Pas le mot was curiously translated by one candidate as 'Pass the word.'

Voulez vous, ne voulez-vous pas was translated by several as 'Will you or will you not?'

Sauf correction is a colloquialism, meaning 'If I am not mistaken.'

On signe, which read with the context should have been very simple, produced a shoal of peculiar renderings. 'Made the sign of the cross,' 'gesticulate,' 'make signs,' 'salute,' 'waved their assent,' 'bowed assent,' 'nodded to each other,' 'nodded assent,' 'made a sign of satisfaction,' 'stamp their feet,' 'each salutes his friends,' are some of them.

Faire notre partie means 'play our game.' Some did not appear to be acquainted with this use of *partie*.

Il aspire à descendre was rendered too literally by most candidates. The meaning is that the objects of his ambition are unworthy of so great a man, so that he is aiming at what is beneath him.

One candidate notified on the paper sent in the fact that no assistance had been sought from a dictionary. The conditions of the competition admit of any aid of this character being sought. In the particular case referred to, the non-use of the dictionary led to a great many errors being made.

MAY PRIZE COMPETITION.

A Prize of One Guinea will be given for the best translation into English of the following extract:—

J'avais vu des hommes très dignes de respect, j'avais vu aussi des hommes féroces: il n'y avait rien dans l'impression que Bonaparte produisit sur moi qui pût me rappeler ni les uns ni les autres. J'aperçus assez vite, dans les différentes occasions que j'eus de le rencontrer pendant son séjour à Paris, que son caractère ne pouvait être défini par les mots dont nous avons coutume de nous servir: il n'était ni bon, ni violent, ni doux, ni cruel, à la façon des individus à nous connus. Un tel être, n'ayant point de pareils, ne pouvait ni ressentir ni faire éprouver aucune sympathie: c'était plus ou moins qu'un homme. Sa tournure, son esprit, son langage, sont empreints d'une nature étrangère, avantage de plus pour subjuguer les Français, ainsi que nous l'avons dit ailleurs. Loin de me rassurer en voyant Bonaparte plus souvent, il m'intimidait toujours davantage. Je sentais confusément qu'aucune émotion du cœur ne pouvait agir sur lui. Il regarde une créature humaine comme un fait ou comme une chose, mais non comme un semblable. Il ne hait pas plus qu'il n'aime; il n'y a que lui pour lui; tout le reste des créatures sont des chiffres. La force de sa volonté consiste dans l'imperturbable calcul de son égoïsme; c'est un habile joueur d'échecs dont le genre humain est la partie adverse qu'il se propose de faire échec et mat. Ses succès tiennent autant aux qualités qui lui manquent qu'aux talents qu'il possède. Ni la pitié, ni l'attrait, ni la religion, ni l'attachement à une idée quelconque, ne sauraient le détourner de sa direction principale. Il est pour son intérêt ce que le juste doit être pour la vertu: si le but était bon, sa persévérance serait belle.

MME. DE STAËL.

RULES.

1. All translations should be posted not later than May 10, and addressed:—*Prize Editor*, Office of THE PRACTICAL TEACHER, 33, Paternoster Row, London, E.C.
2. Competitors should cut out, and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should adopt a pseudonym, and send name and address written on a separate piece of paper.

ANNOTATED CODES.

I. **The N.U.T. Edition, 1897.** By J. H. Yoxall, M.P., and T. A. Organ, B.A. The well-known N.U.T. Edition of the Code appears for the fifth year, and the present issue is more perfect than last year's. It contains not only the text of the Code and Instructions to Inspectors, but an accumulation of Departmental forms, decisions, rulings, which could only be collected by the officers of the Union. The syllabus for Pupil Teachers, Scholarship, and Certificate candidates is included, there is a good chapter on the New Inspection, and the valuable notes on the Laws of School Hygiene by Mr. Abel have been enlarged. It contains all that Managers and Teachers could possibly want, and more praise than that could hardly be given.

II. **The New Code and Pocket Diary for 1897–98** (Jarrold & Sons, London). This useful little publication is now in its fifteenth year, and with the progress of matters educational it has grown somewhat in bulk. It is still, however, truly handy, and contains in a compact form all the official information a teacher under the Education Department needs. This information is so carefully classified as to make it easy of reference, and all changes are indicated by italic type. Space is provided for school memoranda, for time-tables, records of examinations, and notes on the standard work. It might fairly be described as *multum in parvo*.

III. Another popular Code is **Heller's** (Bemrose & Sons), which has now reached the 37th edition, and which contains a clear exposition of many knotty codal points, together with all the usual forms, etc.

'REVIEW OF REVIEWS' OFFICE, LONDON.

The Song of Hiawatha. By Henry W. Longfellow. **Shirley.** By Currer Bell (abridged). Mr. Stead has added these notable books to his two cheap series—the first to the **Penny Poets**, the second to the **Penny Popular Novels.** 'Hiawatha' would form excellent reading for the upper standards in a school. Reading the condensed edition of Charlotte Brontë's great novel may well send readers to the complete work, as the editor desires.

We may mention that Mr. Stead has formed from the two series a lending library of 100 volumes in cloth arranged with voucher cards and catalogues in a painted library box with lock and key. This affords a capital mode of providing a cheap school library.

Our Science Section.

Subscribers requiring Explanations of Difficulties in any Branch of Science, or Advice upon Courses of Study, can obtain all help required by communicating with the Editor, and accompanying their query with the Coupon cut from this No.

NOTES ON PHYSIOLOGY:

EMBRACING THE SUBJECTS OF THE ADVANCED AND HONOURS STAGES, SCIENCE AND ART DEPARTMENT.

BY WALKER OVEREND, M.A., M.D. (OXON), B.SC. (LONDON),

Physician to the Tottenham Hospital;
Late Radcliffe Fellow, Scholar of Balliol College, and Exhibitioner in Comparative Anatomy of the London University.

QUESTIONS are often asked concerning the structure and functions of the various parts of the alimentary tract, such as the stomach, small intestine, large intestine, liver, and pancreas.

The stomach consists of four coats—mucous, submucous, muscular, and peritoneal. The mucous membrane of the stomach presents numerous folds or rugæ, and on examination with a lens numerous depressions may be observed, which are the open mouths of the gastric glands. These are simple tubes which occupy nearly the whole thickness of the mucous membrane. The whole of the mucous membrane is covered with a layer of cylindrical cells. The glands of the stomach are divisible according to their position into cardiac and pyloric. The first portion of a cardiac gland is lined by a layer of columnar cells. In the remainder, cells of two kinds are visible; those on the outside are granular and nucleated, and stain deeply with aniline blue. The other cells are much smaller and cubical in shape, and are termed central cells. The glands in the pyloric area are tubular, and lined by columnar cells, except the lower portion, which contains small cells like the central cells of the other part of the stomach. The gastric juice contains about 1 per cent. solids, of which 0·4 is pepsin, and 0·2 free hydrochloric acid, the rest being chlorides of sodium, calcium, etc.

The central cells apparently secrete pepsin, and a ferment which coagulates milk—the rennet ferment; the large oval cells secrete the acid. Certain changes occur in the cells during secretion; for instance, the granules in the central cells become much less numerous after secretion, and the large parietal cells become somewhat larger during the process of digestion.

The essential attribute of the gastric juice is the power of breaking down and dissolving a large part of the solid proteid food, and ultimately converting it into peptone. This power depends on the coexistence in the gastric juice of a ferment—pepsin—and an acid, namely, free HCl. Neither pepsin nor HCl is active alone, but a mixture of the two, in the presence of water and at a suitable temperature (98° F.), act essentially in the same manner as gastric juice.

Peptones are not coagulated by heat, and they are not precipitated by a mixture of potassium ferrocyanide and acetic acid. They are, however, precipitated by alcohol and by corrosive sublimate, and yield a beautiful rose colour when a very dilute solution of copper sulphate is added. Other proteids give a violet colour.

In whatever way peptone is produced, there are certain products intermediate between the albumin and the peptone, and these bodies are termed albumoses.

Peptone begins to be formed in the stomach during the first hour after digestion commences; but it never accumulates, since it is absorbed into the veins with equal rapidity, and carried at once to the liver. In traversing the wall of the stomach and small intestine, it is thought, however, that it undergoes a change, being reconverted into a soluble form of albumin. Certainly there is but a trace of peptone in the portal vein.

Describe the miscroscopic character of the submaxillary gland in man, and discuss the physiology of the nervous mechanism of the secretion of saliva.

In this question describe the fibrous connective tissue capsule sending in septa, dividing the gland into lobes, then into lobules, and these again into alveoli, where the active process of secretion takes place. The duct opens into the mouth, and on passing towards the gland divides, sending one branch to each lobe, and each of these divides to enter each lobule. Just where the duct is about to communicate with an alveolus it is lined with flattened cells. Each alveolus has outside it a lymphatic space and a network of capillary blood-vessels. Within the alveolus the true secreting cells are found, and the latter vary in appearance with the condition of the gland. If no food has been taken for some hours, that is, if the cells have been resting, they are filled with granules; but if the gland has been active, the granules have disappeared from the outer parts of the cells, and the nuclei have become visible. Some alveoli contain what are called half-moon or demilune cells. These lie on the outside and, like the parietal cells of the gastric glands, stain deeply with aniline blue. Each gland is supplied by branches from the sympathetic and a cranial nerve. The chorda tympani of the facial supplies the submaxillary and sublingual, the auriculo-temporal of the fifth supplies the parotid; but these reach the auriculo-temporal really from the glossopharyngeal nerve.

Note that the chorda tympani when stimulated produces a dilatation of the blood-vessels of the gland and a secretion of thin watery saliva, and when the sympathetic is stimulated the blood-vessels become constricted and a thick viscid saliva is secreted. Now discuss the reflex secretion of saliva, nerve impulses being carried up by the lingual and glossopharyngeal nerves from the tongue to the nerve centre in the medulla, from which impulses again pass by the chorda tympani, etc. (*Vide* Author's Elements, page 108.)

Describe the minute structure of the pancreas and the changes which the cells undergo during secretion. Enumerate the constituents of pancreatic juice.

In respect to the structure, the pancreas is very similar to a salivary gland. In the resting stage, every cell is loaded with granules, which diminish as the cells become active. The granules are used up in forming the constituents of the secretion. The pancreas begins to secrete when food enters the stomach, but is most active about two hours afterwards, and then abates a little, and again increases when the pylorus permits the food to leave the stomach.

Constituents of the juice—

1. Organic substances, albumin and ferments, and mineral constituents—NaCl, sod. phosphate and sulphate, etc., 5 per cent.
2. Water, 95 per cent.

The ferments are trypsin, diastase, and a ferment acting upon fats, and splitting them up into fatty acids and glycerin.

The action of trypsin on albumin may be summarised thus—

Albumin, with trypsin and solution of sodium carbonate (1 per cent. strength), forms at 98° F., finally antipeptone and hemipeptone, of which the latter is further split up and yields leucin, tyrosin, and finally indol, ammonia, H and CO_2, etc.

The diastase converts starch into dextrose.

The liver is an important subject—the microscopic structure of a lobule—the difference between the liver of an animal which has been starved and one which has been well fed.

The bile is the secretion of the liver, and about 15 ounces are secreted daily. Its reaction is alkaline. The constituents are—

(1) The bile salts.
(2) The bile pigment (bilirubin).
(3) Cholesterin.
(4) Mucin.
(5) Certain salts of sodium, calcium, and iron.

About 10 per cent. are bile salts.

A solution of bile salts resembles bile itself in its action on fats. The secretion of bile is intimately dependent on the blood supply. If the portal vein be ligatured, the secretion stops at once. The test for bile salts is the addition of a solution of cane sugar, and then a few drops of strong sulphuric acid, which produces a violet colouration. The bile pigment is derived from the hæmoglobin of the red corpuscles. When hæmoglobin in solution is injected into the blood-vessels, the rate at which the colouring matter of the liver is secreted increases enormously, and bile pigment appears in the urine. The bile salts are produced by the liver itself, as after the liver is removed they do not accumulate in the blood. They must arise from proteids.

With regard to the structure of the liver, it consists of a multitude of lobules, about the size of a pin's head, somewhat flask-shaped, and separated from each other by prolongations of the external fibrous covering of the liver. The lobule is crowded with cells. The liver cells are cubical in shape, containing a nucleus, granules of glycogen, and droplets of oil. The large portal vein, with the hepatic artery and hepatic duct, lies in the transverse fissure of the liver, and is invested in connective tissue. The branches of the portal veins become smaller and finally reach the spaces between the lobules, where they are called the interlobular veins. From these, small branches enter the lobule itself on each side and pass towards the centre, where they unite again to form an intralobular veinlet. These unite into veins, and finally form the three hepatic veins, which run to the inferior vena cava. The capillary network of each lobule is so small as to only admit two cells abreast, though there is room for several arranged tandem. Where the sides of the liver cells are in contact, the high powers of the microscope may detect the existence of minute holes, which is the section of a minute canal—a bile capillary. These finally unite to form the hepatic duct. Every liver cell touches a blood corpuscle on one side, and each side is grooved for a bile-capillary. Evidently between the blood and bile capillaries a portion of liver cell is interposed.

When a small quantity of bile is added to olive oil, an emulsion is readily produced, especially on shaking. The same occurs with the pancreatic juice. Both the bile and the pancreatic juice appear to be implicated in the emulsifying and absorbing of fat from the small intestine. When the pancreatic duct is ligatured, fat is still absorbed to some extent. As a matter of fact, however, both the bile and the pancreatic juice are fellow-workers in this direction, but their effects are finished as soon as a fine emulsion is formed. The rest of the business is a vital one. The fat droplets pass into and through the epithelial cells covering the villi, the fat then passes into the lymph spaces of the villus, and thence into the lacteals. Most of the water and sugar of the food get at once into the blood capillaries. In the epithelial cells also, in all probability, the peptones are changed into albumins, and pass on to the capillaries and roots of the portal vein.

The greater part of the proteid of food enters the blood therefore as albumin, and is carried as such to the tissues. The N of the proteid leaves the body again, chiefly in the form of urea. Urea is present in the blood to the extent of about 2 parts per 10,000. By feeding an animal with chloride, citrate or carbonate of ammonium, the urea of the urine is increased, and this process takes place largely in the liver. The liver splits up some of the proteids passing though it, and converts the substances resulting partially into urea. A portion of the proteid also yields sugar in this process. The glycogen of the well-fed liver, on the other hand, is dependent on the sugar formed in the alimentary canal, and it does not exist in the liver of starving animals.

The minute structure of the small intestine, and the nature of its secretion.

In this question note (1) The Valvulæ conniventes.
(2) The Villi.
(3) Peyer's patches (in the ileum).

Describe the mucous membrane, the muscularis mucosæ, and the adenoid tissue, also the Lieberkühn's follicles and the lymphatic nodules. The intestinal juice is yellow, thin, alkaline, and contains solids about 2 per cent., namely proteids and salts. The only action which we can safely attribute to it is the power of converting starch into sugar.

TO STUDENTS SITTING FOR THE MAY EXAMINATIONS.

There are certain other important questions to which the student should refer, as the mammary gland and the composition of milk; the structure and functions of a lymphatic gland, and the causes which aid in the flow of lymph towards the heart; the structure of the kidney, and the secreting part of the tubules, with the proof that urea is secreted by these cells; the structure of the retina, the formation of images, and the proof that the processes of vision begin in the rods and cones; the structure and functions of the spleen; the structure of a spinal nerve, and its manner of attachment to the cord; the various parts of the cord as seen in transverse section; the structure of the olfactory organ, and the taste-buds. All these points have been described in former numbers of the PRACTICAL TEACHER.

CHEMISTRY NOTES.

BY THOMAS CARTWRIGHT, B.A., B.SC. (LOND.),

First Class Honoursman in Chemistry (Science and Art Department), Head Master, Finchley Organised Science School, and Lecturer therein on Chemistry.

Ozone in the Atmosphere of Mont Blanc.—M. de Thierry gives the following interesting account of his examination into the condition of the atmosphere of Mont Blanc's summit with respect to the ozone contained therein. 'In September 1894 I was struck with the rapidity with which slips of amidised ozonoscopic paper (Shoenbein's paper) and red litmus paper saturated with KI (Houzeau's paper), exposed to the air on the platform of the observatory on the summit of Mont Blanc, at the altitude of 4,812 metres, took respectively deep violet and blue colourations. Paper steeped in thallous oxide was equally and rapidly blackened with formation of thallic oxide (Bœttger reaction). It was the same with plates of silver which I had prepared by reducing a solution of silver nitrate with lactose.

'These first observations were already interesting, when—on Tuesday, August 15th, at noon—I, along with my two guides, was attacked by a tempest of snow (altitude of 4,200 metres), accompanied by numerous peals of thunder, and the fall of hailstones perfectly spherical and of the size of large peas.

'A violent north-west wind was blowing, and the thermometer, which before the storm was at 0° C., fell rapidly to —15. A number of hailstones, collected on a sheet of iodo-amidised ozonoscopic paper, made immediately circular violet spots, larger than the diameter of hailstones, the centre of the spots occupied by the hailstones being paler than the circumference. The violence of the storm did not allow me to examine closely if these spots were formed by an atmosphere of ozone surrounding the hailstones when they fell or by hydrogen peroxide (which might give the same action) derived from the melting of the hail. I must add that the snows (recent and old) taken on adjoining heights have never given the characteristic reactions of hydrogen peroxide. The water from melted snow has always given the characteristic reaction of ammonia with Nessler's test.'

The author proceeded to determine quantitatively the atmospheric ozone on Mont Blanc. He finds that at Chamounix (1,050 metres) the atmospheric ozone is 3·5 mgms., and on the Grand Mulets (3,020 metres) 9·4 mgms. per 1,000 c. metres of air, that is to say, nearly four times greater than at Paris. The quantity of ozone therefore increases with the altitude.

The May Examinations.—(*a*) **Theoretical.**—May 11th is the date fixed for this examination in all the three stages. Now is the time for the readers of the PRACTICAL TEACHER to turn to the back numbers, especially those which contained the answers to the questions set in May last, and the January number which contained the gist of the remarks of the examiners upon the work done in all the stages of both the theoretical and the practical branches of inorganic chemistry.

This is now the second year of what may be termed the new *régime*, and we can tell better what is to be expected in the way of questions than we could do this time last year.

Elementary students must know their metric system, and a question involving weight from volume by means of specific gravity may confidently be expected (see Question 2 in last year's questions).

The commercial names of common substances must be well known, or work otherwise easy will become impossible to cope with, as in Question 2 of last year's paper. Litharge, nitre, sal-ammoniac, caustic soda, and potash, quicklime, brimstone, and oil of vitriol, are examples of what is meant. For the rest ability to describe these and other common objects of the lecture table must be shown, and experiments to back up the simple law of definite proportions and to mark off chemical from physical properties will probably be asked for. The halogens must not be forgotten.

Advanced Students will be taken then on the usual round of subjects. Judging from last year's papers the questions may be expected to include some at least of the following :—**Bleaching-powder and chlorine, sulphuric acid manufacture, ozone and its constitution, soda crystals, the acids of the halogens, differences between metals and non-metals** with questions on the **manufacture of sodium and potassium**. **Percentage composition and formulæ, gaseous diffusion,** the **Periodic Law** are the theoretical points likely to crop up.

Honours Students should be well acquainted with the history of chlorine as given by Dr. Ludwig Mond in his address to the Chemical Section of the British Association. Argon and Helium have also been sufficiently prominent in chemical quarters for the examiners to be justified in asking for a summary of present knowledge and theory as applies to these two recent comers. Signs are not wanting of a revulsion against the Periodic Law, especially as applied to the rise and fall of properties in sympathy with increased or decreased atomic weight, and it will be well for the student to be posted as to the pros and cons respecting this law of Newlands and Mendelieff. The fault most prevalent in this connection is that of over credulity as to the extent to which properties of elements are a function of their atomic weights. Thomson and his Thermo-Chemistry cannot be neglected, nor can Moissan's electric furnace be allowed to slip from notice, although these two points were touched upon in last year's papers.

(*b*) **Practical.**—The date for the Advanced and Honours Examination is May 22nd. Advanced students must look to their qualitative work, which, notwithstanding the crying down of this branch of the work, was the real deciding factor last year, the volumetric work being quite easy. Now the four salt radicles may be given without regard to the basic or the acidic sides of the salt, it behoves the student to be on the look out for difficultly-soluble oxides and for out-of-the-way acids, such as phosphates, manganates, permanganates, chromates, etc. In addition, he is recommended to simplify his work by first analysing the easibly soluble substance of the mixture containing a fairly soluble and a portion troublesome to dissolve, and then dealing with the insoluble matter separately. This is such a simple and efficacious means of separating that it is hard to understand why it is not more frequently resorted to. And then the dry reactions are but too frequently done unskilfully and carelessly, and an association in the wrong direction thus set up, which produces perplexity and too often spoils the work. We recommend the student to go well over his dry work, and especially we commend him to the detection of chromium and magnesium whether as anhydride or base by means of the platinum foil experiment. And now one word as to the volumetric work. Your lecturer will know beforehand what standard solutions are to be prepared, which is tantamount to a declaration as to what the exercise is to be. Be sure then to get to know what standard solution you are to use and get as much time for practising with it as you can. Last year the Department, 10 days prior to the examination, warned secretaries that a standard solution of permanganate of potash was to be prepared, and, no doubt, the same procedure will be followed this year.

The elementary examination is down for the 29th May, being, as usual, the concluding examination of the evening series.

For the benefit of those of our readers who are unacquainted with what was set last year we may state that three exercises were given of which two had to be chosen. One was a very easy qualitative experiment. Another was to weigh out and oxidise a given weight of magnesium ribbon; whilst the third was to heat a body, to describe what transpired upon testing, and to state the difference in weight. The great difficulty was with the balances, one between six, the Department's requirement, being ludicrously inadequate. We advise our readers to choose one quantitative and one qualitative test, and to push forward the former in order to be able to do the final weighing leisurely, and so avoid the error inseparable from haste.

Of the **Honours Examination** we have said nothing, for the simple reason that it is a dark horse, only to be described when the time of trial shall cause it to disclose itself. In our opinion the number of Honours students in Chemistry this year will be small enough to satisfy the Department, who seem to be anxious to reduce students of this stage to a vanishing point.

NOTES ON PHYSIOGRAPHY.

Decimal Time and Decimal Circumference.—Efforts are being made in France to decimalise the divisions of time and to also divide the circumference of a circle decimally. It is suggested that each hour of the day be divided into 100 parts, and that each of these parts be further divided into hundredths.

The Coccospheres and Rhabdospheres of Globigerina Ooze.—Messrs. Murray and Blackman are the authors of a very interesting article under this head in *Nature*. 'A few years ago Dr. John Murray, while crossing the N. Atlantic, obtained the Coccospheres by simply pumping sea water through a very fine silk bag.' This was the way in which the specimens referred to in the article were obtained. The *Challenger* report thus describes these important organisms : 'There is considerable variety both in the form and size of Coccospheres and Rhabdospheres, some varieties having the component parts (Coccoliths and Rhabdoliths) much more completely united in a sphere than others. The interior of the spheres is perfectly clear when examined fresh from the surface. When the calcareous parts are removed by dilute acids, a small gelatinous sphere remains, in the outer layer of which the Coccoliths and Rhabdoliths were embedded.' The writers further add : 'The calcareous scales (or Coccoliths) overlap each other and constitute not only an excellent defensive armour, but, from their arrangement, admit of the growth of the organism, which is not thus limited by its calcareous coat as the diatoms are by their silicious shells. Each Coccolith is attached to the cell by a button-like projection on its inner surface.' After a further detailed description of the structure of the organism, the writers conclude as follows:—'The importance of the part probably played by Coccospheres and Rhabdospheres in the economy of marine life entitles them to a large claim on our interest. They abound in regions of the ocean, out in blue water, and far away from coastal waters, where diatoms and Peridiniceæ are comparatively scarce; and here their occurrence is in such plenty that their shells on sinking to the bottom constitute nearly 20 per cent. of some deep-sea deposits. Of a like geological history with the diatoms first appearing in the ancient Cretaceous seas, Coccospheres and Rhabdospheres probably share with them the *rôle* of food-providers to the animal life of the ocean.'

Murray's Theory of Coral Islands.—Dr. John Murray, at the meeting of the Royal Society on March 15th, read a paper on the above subject. He claims that more and more submerged volcanic cones, which are the foundation of coral atolls, have been discovered in the coral seas. Some are rising by the accumulation of shells and various dead calcareous animals; others are being worn down by tidal action in the same way as certain parts of the ocean bed are kept clear of mud. These facts, he claims, further help his theory. A second paper, dealing with the growth of corals and more especially with their food, is shortly to be read before the Royal Society by Dr. Murray.

The Coming May Examinations.—These are fixed as follows :—Evening Examination, May 3rd, 7 to 10; Day Examination, June 25th, 2 to 5 p.m.

Elementary.—The interest attaching to this section of the subject consists in the fact that there will be, for the first time, two elementary stages, viz., Section I. and the full elementary stage. The former can be taken this year by those students only who belong to classes where the grant is to be paid, not according to results, but according to attendances. Why, the Department alone knows. Students must be carefully warned as to this, and those who are taking the full Elementary should be told that they are required to answer questions in Section I. as well as in the other sections.

Advanced.—This will proceed on the usual lines. Questions may be set on Mars, on the Leonids, or on the theories of coral island formation, these having been burning topics during the year.

Honours.—Mars may be expected here, as Mr. Lowell's book on Mars has aroused much attention. Of the other planets Venus and Mercury are most likely to crop up, judging from the work of Prof. Brenner on the rotation period of these planets. The question of ocean currents has also come prominently to the front in connection with the Nansen expedition, so that it will not be surprising if a question is put on this topic; the student will also do well to be well posted as to the Darwinian and Murray theories of coral island formation, for, as may be seen from the notes of this and previous months, Dr. Murray is bringing his theory well to the front. It will be well to remember that Prof. Lockyer is supremely interested in the composition of heavenly bodies as determined by spectrum analysis, and that Prof. Judd is the apostle of volcanoes and volcanic phenomena, so that reference to these branches of the syllabus may not unreasonably be expected.

MATHEMATICS.

STAGES 2 AND 3, SCIENCE AND ART DEPARTMENT.

BY G. A. BAXANDALL,
Assistant, Mathematical Division, Royal College of Science, London.

HINTS TO STUDENTS SITTING FOR THE MAY EXAMINATIONS.

STAGE 2.

Algebra.

In the first place the student should be able to solve quadratic equations by what we may term the *factor method*, as well as by the more general method of *completing the square*. By becoming accustomed to the former method, he is at the same time acquiring that most valuable power of readily detecting the factors of mathematical expressions.

The quadratic equation $x^2 - 15x + 56 = 0$ becomes $(x-8)(x-7) = 0$, hence $x = 7$ or 8, *i.e.* the roots are 7 and 8.

One ought to be quite familiar with the simple relations which exist between the roots and the coefficients of a quadratic equation. For example, *Arts.* 323, 324, 328, and 330 in H.S. should be read, or *Arts.* 339, 340, 341 in H.K., with the examples which are there worked out.

The essence of all this is contained in Equations (3) and (4), Art. 328, H.S., or in Statements (i) and (ii) Art. 339, H.K., and equations (1), (2), (3), Art. 340.

Examples of the type illustrated by the one headed *Baccalao* in 'Query Column,' March P.T., p. 528, should be studied. See H.K., Arts. 225, 226. The method employed in the solution to the example just referred to is quite straightforward and is applicable in many examples.

The student should be able to find, by a method of trial, the factors of an expression like $x^3 + 9x^2 + 26x + 24$. Try putting $x = 1, -1, 2, -2, 3, -3$, and so on until the expression vanishes for one of these values. For example, -2 put for x makes the expression vanish; therefore $x - (-2)$ or $x + 2$ is a factor; the other factor or factors are then easily obtained.

It is necessary that one should have perfectly clear notions on the elementary portions of the subject of indices. Thus

$$(x^m)^n = x^{m \times n},$$

while

$$x^m \times x^n = x^{m+n},$$

One should be ready to put

$$\frac{1}{x^3} = x^{-3},$$

or,

$$\sqrt[3]{x} = x^{\frac{1}{3}},$$

or,

$$\frac{a^{-3}}{\sqrt[4]{x}} = \frac{x^{-\frac{1}{4}}}{a^3},$$

and so on, and to simplify such expressions as

$$\left\{ \sqrt[5]{\frac{a^{\frac{1}{2}}x^{-2}}{x^{\frac{1}{3}}a^{-2}}} \times \sqrt[3]{\frac{a\sqrt{x}}{x^{-1}\sqrt{a}}} \right\}^{-4};$$

$$\left(a^{n^2-1}\right)^{\frac{n}{n+1}} + \frac{\sqrt[n]{a^{2n}}}{a}.$$

Also be sure about the meanings of the terms usually occurring in connection with the subjects of ratio, proportion, and variation.

Trigonometry.

The definitions of the six trigonometrical ratios of angles less than or greater than a right angle should, of course, be known thoroughly. If the numerical value of *one* be given, then those of the *other five* can be found. For example, if $\tan A = \frac{3}{4}$ and cosec A be asked for, then a triangle BAC, right angled at C, should be drawn and the numbers 3 and 4 attached to BC and AC respectively, then by I. 47, AC = 5 and $\operatorname{cosec} A = \frac{5}{3}$. But many students are in the habit of using a more risky method. They appear to have *learnt* that

$$\operatorname{cosec} A = \frac{\sqrt{1 + \tan^2 A}}{\tan A},$$

and therefore

$$\operatorname{cosec} A = \frac{\sqrt{1 + (\frac{3}{4})^2}}{\frac{3}{4}} \text{ or } \frac{5}{3}.$$

Figures should be used on all possible occasions, for it indicates a thorough and intelligent grasp of the subject.

We should have added that a clear notion of the size of a *radian* (or the unit of circular measure) as compared with a degree is necessary. One gets accustomed to *think* in degrees; it is just as necessary to acquire the habit of thinking in radians.

The values of the trigonometrical ratios of the angles 30°, 45°, 60°, 90°, and also 15° and 75° should be known thoroughly. The student should be able to show, *by means of figures*, how the ratios of other angles, such as 150°, 210°, 315°, 480°, etc., depend upon those of 30°, 45°, 60°; in doing this the main source of error is in the *sign* to be attached.

The proofs of the ordinary rules in logarithms should be known, and examples should be studied of the type of Exs. 53, 54 (February P.T.), 57, 58, 61 (March P.T.), and 67 (April P.T.)

We need not add how necessary it is to be able to give a proof of any formula used in the solution of triangles. In connection with this portion of the subject the student must not be surprised, if on requiring, say, L cos 36° 42′ he finds it is not given, for L sin 53° 18′ will do equally well. Similarly, if L cot 25° 6′ be required, then L tan 25° 6′, or even L tan 64° 54′, will do.

Every candidate should be familiar with the two expressions

$$\tfrac{1}{2}ab \sin C \text{ and } \sqrt{s(s-a)(s-b)(s-c)}$$

for the area of a triangle.

Euclid.

In proving a proposition in Euclid a student should *know* what he is proving, and be able to state this in his own words. In Book II. Props. 4–8 and 11–14 are the more important ones; in Book III., 14, 15, 17, 20, 21, 22, 25–37, and in particular, Props. 20, 21, 22, 31, 32, 35.

STAGE 3.

Algebra.

Chapter IX. in H.K. should be carefully studied, especially Arts. 113, 114, 115, 116, 117, 119, 121, 128, and the examples worked out therein. In *Tod.* the corresponding Arts. are 335, 336, 339, 345. The solutions in the 'Query Column' (March P.T.) headed '*Baccalao*' and '*Disciplus*' might be read.

With regard to the Progressions, the student should always be ready to write down the standard series for an A.P. and G.P., and deduce the expressions for the n^{th} term; he should be quite familiar with the proofs of the formulæ for the sum of n terms of either series, and for the sum of an infinite G.P. We have often referred to the series in Art. 60, H.K., or Art. 473, *Tod.* The expressions for the arithmetic, geometric, and harmonic means should be known.

We fear that any remarks which refer to the subject of Combinations and Permutations will be of little use. It is only after much practice that one can deal with examples successfully unless they merely require the direct application of the formulæ for C_r or ${}_nP_r$; these should be known, as well as the way in which they are established. After all, one must rely on the fundamental principle so carefully stated in Art. 140, H.K.

In connection with the Binomial Theorem we should like to refer students to certain past numbers of the P.T., for example, April 1895 and April 1896.

One ought to try the effect of putting $x = 1, 2, 3$, etc., in the expression

$$(1+x)^n = 1 + nx + \frac{n.(n-1)}{1.2}x^2 + \ldots\ldots$$

and observe the relations which are thereby shown to exist between the coefficients. Similar tricks ought to be played by putting in such values as $x = \frac{1}{2}, \frac{1}{3}$, etc., in such expansions as those of

$$(1-x)^{\frac{1}{2}},\ (1-x)^{-\frac{1}{2}},$$
$$(1-x)^{-1},\ (1-x)^{-2},$$

and observing the forms and values of the arithmetical series thus obtained.

Trigonometry.

It will be necessary to have considerable practice in proving geometrically the formulæ for sine, cosine, and tangent of an angle (A + B) or (A − B), the angles A and B having any value whatever. From these there may be easily deduced formulæ for the sums and differences of sines and cosines, but these should also be proved geometrically, as well as the formulæ for sine, cosine, and tangent of 2A, in terms of the ratios of A. A student is ill prepared if on seeing such an expression as $\cos^2 C$ he be not ready to put

$$\frac{1 + \cos 2C}{2}.$$

He should be just as ready to write

$$2\cos^2\frac{A}{2}$$

for $1 + \cos A$.

The proper form in which to learn such formulæ is

1 + cosine (any angle whatever) = 2 cos² (the half angle),
1 — cosine (any angle whatever) = 2 sin² (the half angle).

Twenty expressions such as

$$1 + \cos 40°,\ 1 - \cos 20°,\ \cos^2 \frac{C + D}{2},\ \sin^2 (A + B),\ \cos^2 4a,$$

and so on, and the equivalents of these should be written down in terms of the half angle or double angle as the case may be. If the student has not already recognised the great value of such formulæ, he will do so as he continues working at the subject.

Again, if a product of a sine and cosine, or a cosine and cosine, or a sine and sine, *i.e.* such expressions as

$$\cos 20° . \cos 70°, \qquad \tfrac{1}{2} \sin (A + B + C) . \sin (A - B - C),$$
$$4 \sin (A + B) \cos (A - B), \qquad \cos 2a . \sin a$$

occur, he should be ready to step from these to the sum of two cosines, sum of two sines, or whatever the equivalent may be; the point is, he should be very *familiar* with these. If he be not, then he must write down twenty such expressions at random and practise such changes; it is simply a matter of a half-hour's juggling with such expressions.

The values of the trigonometrical ratios of such angles as 30°, 45°, 60°, 90°, also 15°, 22½°, 75°, 37½°, 18°, 36°, 54° should be known, or, with regard to the latter set, a quick method of obtaining them is essential.

For example, from cos 45° we easily obtain sine or cosine of the half angle, 22½°.

The way in which proper signs are settled in the formulæ

$$2 \sin \frac{A}{2} = \pm \sqrt{1 + \sin A} \pm \sqrt{1 - \sin A}$$

$$2 \cos \frac{A}{2} = \pm \sqrt{1 + \sin A} \mp \sqrt{1 - \sin A}$$

when particular values of A are given should be known; every text-book deals with them.

We might also mention the general expressions for angles having a given sine, cosine, or tangent. "Loney" deals with these in a clear manner.

In the April issue of 1896 will be found a collection of formulæ and expressions, with proofs, in connection with the subject of inscribed, circumscribed, and escribed circles of a triangle; these should be worked up thoroughly.

MAGNETISM AND ELECTRICITY.

BY EDWIN EDSER, A.R.C.S.,

Mathematical Lecturer and Physical Demonstrator, South Western Polytechnic, late Assistant in the Physical Laboratory, Royal College of Science.

SUPPOSE that two concentric conducting spherical surfaces are taken, the outer one being connected to earth, and the space between the two being occupied by air, then it has been shown in a former paper that the capacity of the system

$$= \frac{r_1 r_2}{r_2 - r_1},$$

where r_1, r_2, are the radii of the internal and external spheres respectively. This means that if the condenser be charged with a quantity of electricity, numerically equal to

$$\frac{r_1 r_2}{r_2 - r_1},$$

a potential difference between the two surfaces will be produced equal to one unit of potential; or that, with the above-mentioned quantity of electricity on the inner sphere, one erg of work would be performed in bringing one unit of electricity from the outer to the inner spherical surface.

Consequently, if C represents the capacity of the system, then CV = Q, where V represents the difference of potential between the surface, and Q the quantity of electricity on the inner surface.

If now the space between the two surfaces be completely filled by a dielectric such as sulphur, paraffin wax, or paraffin oil, the quantity of electricity remaining unaltered, it will be found that the potential of the condenser is decreased; that is, *less* work will be expended in bringing a unit of positive electricity from the outer surface to the inner than formerly.

If we carefully bear in mind that the work done is given by the sum of a number of terms, each representing the value of the mechanical force acting at a point, multiplied by a distance so short that the force may be considered uniform along it, then we see that we might find the work done between any two points by multiplying the *average* force over the selected path by the distance between the two points.

Returning to our spherical condenser, it is seen at once that the distance between the two coatings is unaltered by the introduction of the dielectric; therefore, since the work done is less, the average force must be diminished. Also, since we suppose that the force is transmitted by the agency of lines of force, we make the following generalisation:—*If, when a dielectric is substituted for air in a condenser, the potential difference between the conducting surfaces diminishes, the tension along the lines of force must be diminished.* Therefore the tension along any line of force in glass, sulphur, paraffin wax, ebonite, etc., must be less than if it existed in air.

Example 1.—A condenser consists of two plane surfaces, separated by air. If one of the plates is charged with a definite quantity of electricity, the other plate being earthed, how will the capacity, potential, and the mechanical attraction between the two plates be modified:—(1) If a slab of paraffin wax be inserted between them; (2) if the condenser be completely immersed in paraffin oil?

(1) Since the quantity of electricity in the condenser is constant, the number of lines of force passing between the plates will remain unaltered; there will, in fact, be $4\pi Q$ lines of force passing between them in either case. But the tension along a line of force within the paraffin wax will be less than when the same line of force remained in air; consequently, the potential difference between the plates will be diminished, and since CV = Q, the capacity of the condenser will be increased.

As, however, the lines of force start from the surfaces *in air*, and the pull between the surfaces is wholly transmitted by the lines of force, the mechanical attraction will remain unaltered. Where a line of force passes into the wax, there will be a greater pull along it, outward, in air, than inward, in the wax. The tendency, therefore, is to strain the wax so as to increase its thickness.

(2) The same arguments as the above apply to the potential and capacity of the condenser, when the whole system is immersed in paraffin oil. As before, the potential will fall, and the capacity will increase. In this case, however, each line of force starts and remains throughout its length in the paraffin oil. Consequently the attraction between the plates will be diminished.

Example 2.—If a dielectric, such as melted sealing-wax, be placed in a bowl, and connected with a Wimshurst machine, fine threads of the wax are shot out. How is this?

The lines of force here start in the dielectric, and pass into air. Since the tension along the lines is greater in air than in the wax, the surface will be pulled upward, and small portions will be shot out with great velocity, forming fine threads.

Example 3.—If a Wimshurst machine is connected by means of an insulated wire with a bowl of paraffin oil, the surface of the latter is agitated. Why is this?

The answer to this question, actually set in a recent Science and Art Examination, is suggested by that to the previous example.

Example 4.—A plate of paraffin wax is hung by an elastic filament in a vertical plane, so as to be partly introduced between the two plane plates of a vertical air condenser. When the condenser is charged, the wax is observed to be sucked in between the plates. Why is this?

From what has been said previously, it is easily seen that the introduction of a greater amount of the paraffin wax between the condenser plates will lower the potential energy of the system. Further, it is a mechanical law of universal application that any system tends to move so as to render its potential energy a minimum. Thus a clock works so as to diminish the potential energy of its spring, water if unconstrained will move to a point where its potential energy is as small as possible, etc. Therefore the wax will move so as to render the potential energy of the system a minimum.

HINTS TO STUDENTS SITTING FOR THE MAY EXAMINATIONS.

Remember that it is better to answer a simple question well than a more difficult one indifferently.

Do not fall into the error of spinning out an answer. If a question can be answered in a single line, do so; any verbiage or unnecessary repetitions will count against you in the examiner's mind.

You will find it far more satisfactory to treat questions on statical electricity from the point of view of lines of force than from the old action-at-a-distance standpoint. A diagram showing the position and direction of the lines of force will often render the solution of a difficult question obvious. Give a mathematical statement of your solution whenever possible.

It is a good plan to begin an examination by carefully reading through your questions, marking those which you can answer. Select one or two with which you are best acquainted, and answer these first. By the time you have done these, any nervousness you may have felt will have passed away, and having made a satisfactory start you may then attack the more difficult questions.

Illustrate your questions, whenever possible, by diagrams, properly lettered. Remember that any attempt to lighten the examiner's labours when correcting your papers will be duly appreciated and rewarded by him.

NOTES ON THEORETICAL MECHANICS.

ADVANCED AND HONOURS STAGES.

BY F. CASTLE, M.I.M.E.

Royal College of Science; Lecturer in Mechanics, Geometry, etc., Morley College, London.

(*Continued from p.* 549.)

69. An engine weighing 12 tons, and working at the rate of 72 horse-power, draws a train of 48 tons on level rails at 3 miles per hour. Find the speed up an incline of 1 in 80.

Ans. 210·7 ft. per min.

The results for the inclined plane may easily be obtained by using the 'Principle of Work.' Thus the work done by the force F is $F \times l$, and work done on W in same time is $W \times h$; $\therefore Fl = Wh$, or $F = \frac{h}{l}mg$; from which $f = \frac{h}{l}g$, the result obtained in the case of the smooth inclined plane. When the plane is rough, there is, in addition, a force of friction μR to be overcome, where $R = \frac{b}{l}mg$; hence resultant force up the plane is—

$$\frac{h}{l}mg + \mu\frac{b}{l}mg, \quad (1)$$

from which

$$f = \left(\frac{h}{l} + \mu\frac{b}{l}\right)g.$$

From eq. (1) the work required to move a body up a rough inclined plane is equal to the work required to raise it directly to the same vertical height plus the work required to draw it horizontally along the base of the plane (when the inclination of the plane is small, the length of the plane may be used instead of the base without any serious error).

70. A train of 150 tons is moving at 30 miles per hour, the resistance 40 lbs. per ton. Find the distance it will move if the steam be shut off, (*a*) along the level, (*b*) up an incline of 1 in 112.

Ans. 1694; 1129½.

Solution.—30 miles per hour = 44 ft. per sec.

(*a*) Let x = distance the train will move, then—

$$40 \times 150 \times x = \frac{150 \times 2240 \times 44^2}{64}; \quad \therefore x = 1694 \text{ ft.}$$

(*b*)
$$40 \times 150 \times s + \frac{s}{112} \times 150 \times 2240 = \frac{150 \times 2240 \times 44^2}{64}.$$

$$\therefore s = 1129\tfrac{1}{2} \text{ ft.}$$

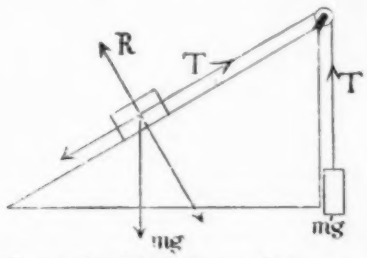
71. A train of 80 tons, travelling at 30 miles per hour, the resistance being 12 lbs. per ton. Find the horse-power, also the distance it will move up an incline of 1 in 100 if the steam be cut off.

Ans. 76·8; 969·7 ft.

72. A train weighing 100 tons is travelling at 45 miles per hour up an incline of 1 in 400. The frictional resistances are 12 lbs. per ton. Find the horse-power developed by the engine.

Ans. 211·2.

Motion of a mass on a smooth inclined plane connected by a string to another mass which hangs vertically.—Let T be the tension of the string, R the reaction of the plane, θ the inclination of the plane to the horizon, m the mass on the plane, and m' the mass hanging vertically.



Resultant force up the plane is $T - mg \sin\theta$.
Resultant force perpendicular to plane is $R - mg\cos\theta$.
Since there is no motion perpendicular to the plane,
$\therefore R - mg\cos\theta = 0$, or $R = mg\cos\theta$.
The moving force on the mass m' is $m'g - T$.
The mass in motion is $m + m'$, hence acceleration

$$f = \frac{\text{moving force}}{\text{mass moved}} = \frac{m' - m\sin\theta}{m + m'}g.$$

The motion is up the plane when m' is greater than $mg\sin\theta$ and down the plane when less.

When the plane is rough, the force of friction will act in the opposite direction to that in which motion takes place, the force of friction is $\mu mg\cos\theta$. (μ being the coefficient of friction).

$\therefore$ Resultant moving force up the plane $= T - mg\sin\theta - \mu mg\cos\theta$.

$$\therefore f = \frac{(m' - m\sin\theta - \mu m\cos\theta)}{m + m'}g.$$

73. (*a*) If a force P acts on a body moving from rest while it describes a distance h, show that $Ph = \frac{1}{2}mv^2$, where m denotes the mass of the body, and v its velocity when the distance has been described. What are Ph and $\frac{1}{2}mv^2$ called respectively? If h is reckoned in feet, m in pounds, and v in feet per second, in what units must P be reckoned?

(*b*) A and B are two bodies connected by a fine thread; B is placed on a rough inclined plane, and is drawn up it by A, which falls vertically; find the velocity when a length h of the plane has been described, and the tension of the thread. (1883.)

Solution.—(*a*) Ph is the potential energy.
$\frac{1}{2}mv^2$ is the kinetic energy.
P will be expressed in poundals.

(*b*) Let mass of A be denoted by m', and mass of B by m, then from the preceding equation—

$$f = \frac{m' - m(\sin\theta + \mu\cos\theta)}{m + m'} \times g;$$

from $v^2 = 2fh$ we get

$$v^2 = \frac{2gh}{m' + m}\{m' - m(\sin\theta + \mu\cos\theta)\},$$

and
$$T = \frac{m'mg}{m' + m}\{1 + \sin\theta + \mu\cos\theta\}.$$

THE MAY EXAMINATIONS.

Those of our readers who intend to take up the Examinations of the Science and Art Department will be, we hope, quite ready for the fray when this number of the 'PRACTICAL TEACHER' reaches them. Perhaps a few notes may be acceptable, and at the outset it is well for the candidate to carefully note that the work of a whole session will be tested by an examination of *three hours*, hence, to obtain the coveted certificate, it is necessary to utilise *every minute* of the time allowed. As there are usually eight questions to answer, try to work at the rate of three per hour. It will be an advantage to commence your paper with those questions which you can answer most easily. It frequently happens that a great deal of time is spent in attempting to answer a difficult question, leaving too little time for the remainder, hence the questions done hurriedly are often incorrect, with the consequent loss of marks. In all cases, wherever possible, draw good diagrams, first sketching them in pencil lightly; these will not only serve to check your numerical work, but also give clearness to your explanations. Remember that *full answers* are necessary to secure a *First Class*. Carefully read over the questions set, and compare with them your answer when written, checking the numerical part if necessary. If a question commenced is found to be too difficult or takes more time than can be spared, cross it out and take an easier one. Be very careful *not to attempt more questions than the number specified*; if you find on looking over your paper that you have attempted too many questions, cross out the excess, leaving only the number required. See the 'PRACTICAL TEACHER' for December 1896, p. 365.

REPLIES TO SCIENCE QUERIES.

Sauve qui peut.—Find the centre of gravity of a beam 20 feet long, 2 feet square at one end, and one foot square at the other.

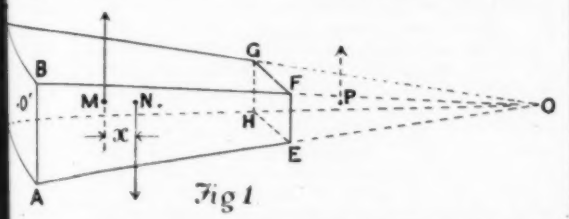


Fig 1

Let ABCD denote the base of the beam (Fig. 1), the smaller end, EFGH, of which is half the size of the base, as the altitudes of similar figures are proportional to the edges, and the edges AB, BC, etc., are each twice EF, EH, etc.; therefore the point o (which is the vertex of the pyramid) is at a distance of 20 feet from EFGH, or 40 feet from the base ABCD.

The centre of gravity of the pyramid ABCD, o, is at N, when N is one-fourth the axis oo'.

Similarly the centre of gravity of the smaller pyramid is at P when oP is $\frac{3}{4}$ the distance from o to the base EFGH.

Volume of a pyramid is $\frac{1}{3}$ area of the base × perpendicular height.

$$\therefore \text{Volume of whole pyramid} = \frac{1}{3} \times 2 \times 2 \times 40 = \frac{160}{3}.$$

$$\therefore \text{Volume of smaller pyramid, or portion EFGH}o = \frac{1}{3} \times 1^2 \times 20 = \frac{20}{3}.$$

Hence if ρ denote mass of unit volume, we can assume that at N there is a force equal to $\frac{160}{3}\rho$ downward, and at P $\frac{20}{3}\rho$ upward; the equilibrant of these is $\left(\frac{160}{3} - \frac{20}{3}\right)\rho = \frac{140}{3}\rho$ acting at M.

Let x = distance of M from N, then, since the distance NP is 15 feet, taking moments about point N,

$$x \times \frac{140}{3}\rho = \frac{20}{3}\rho \times 15,$$

$$\text{or } 140x = 300.$$

$$\therefore x = \underline{2\tfrac{1}{7} \text{ feet}}.$$

Hence the centre of gravity is at a distance $\underline{7\frac{2}{7} \text{ feet}}$ from the base ABCD.

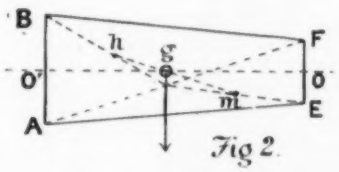


Fig 2

An easy graphical method is shown in Fig. 2. Joining A to F, the quadrilateral AEFB is divided into two triangles; the centre of gravity of the triangle AFB is at h, when Bh is $\frac{2}{3}$ the line joining B to middle point of AF; similarly m is the centre of gravity of triangle AEF; joining m and h a point g is obtained, which joined to the corresponding point on the opposite face of the pyramid gives, at its point of intersection with the axis of the pyramid, the centre of gravity required.

Capitulum.—Questions could only be answered by the Examiner. What is required, too, would depend on the individual Examiner.

Next month we shall begin the first of a series of VISITS TO POLYTECHNICS AT HOME AND ABROAD by The Practical Teacher's Special Commissioner. These contributions will be fully illustrated.

SCIENCE NOTES.

THE DISEASES OF THE SUGAR CANE.—The state of our sugar plantations in different parts of the tropics is causing considerable anxiety to growers because of the increase of the animal and vegetable parasites which infest the canes. The cane fields in the West Indies are being devastated by a parasitic fungus, *Trichosphæria sacchari*, locally known as the 'rind fungus.' The plants frequently grow luxuriously, but when the time for cutting the cane approaches, discoloured patches are seen on the joints half-way up the stem. The disease spreads with great rapidity, and the canes, if not cut directly, deteriorate till they are often not worth the cost of reaping. A disease very troublesome in the sugar growing districts of Queensland and New South Wales is the 'gumming.' In slight attacks cavities appear inside the tissues at the top of the stalk which are filled with offensive matter and accompany the death of the apical tuft of leaves. In bad cases the plants, after they have reached the height of one or two feet, die back, shooting out again from the base, and forming buds half-way down the stalk. The vessels are full of gum, which, under high powers, is seen to be swarming with bacteria, *Bacillus vasculorum*, which apparently produces the gum and causes the stoppage of the vessels. Gumming is a serious disease also in Mauritius and in Pernambuco, the sugar-growing province of Brazil. One of the most puzzling of diseases is 'Sereh,' which is especially prevalent in Java. In bad cases the plants become stunted, the canes are arrested in their growth, and remain short, while the lateral buds swell and grow out, thus giving the plant a bush form, more or less resembling the common lemon-grass, Sereh, *Andropogon Schœnanthsus*. The root system is poorly developed and diseased at the tips, and what food materials find their way into the stem are diverted from the stem cane to the bursting lateral buds. The fibro-vascular bundles are red in colour, especially at the junction of leafsheath and node, and the large vessels are filled with gum, which contains immense numbers of bacteria. Our sugar cane plantations suffer also from the attack of insects. The most formidable and widest in its range is the 'moth-borer,' *Diatræa saccharalis*, a caterpillar which bores its way in all directions in the juicy cane-stalks whenever the sugar cane is grown. The grub of a beetle, *Sphenophorus obscurus*, has proved very destructive to the canes in Fiji. In Java great damage is done to the roots of the cane plant by another beetle, *Apogonia destructon*, which begins its flights during the West monsoon.

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SUGAR CANE DISEASES AND SCIENTIFIC RESEARCH.—The literature of sugar cane diseases is of comparatively recent date, and is largely in Dutch. The Mid-Java Experimental Station has ceased to exist, but a series of important papers was published there by Benecke. Over a score of pamphlets dealing with the diseases of sugar plants have been issued from the East Java Sugar Station. A great number of parasitic fungi have been dealt with at the West Java Station, and some excellent coloured plates of diseased canes have been issued there by Lucaisen. In 1893 the Java sugar planters established a journal devoted to cane matters, the *Archief*, edited by Dr. Kobus, which has become the official organ of the sugar stations. Hardly any descriptive work in cane diseases has at present come from the British colonies, the Government analysts and the directors of botanic gardens being much occupied with administrative work. Some valuable work in this direction has been done at Kew by Michael, Blandford, and Massec, and in the Australian colonies where there are government plant pathologists, a careful study of cane disease has been made from time to time. Many parcels of diseased canes have been sent from West Indian colonies to be examined and reported on at Kew. Watt's 'Dictionary of Economic Products of India' contains a good deal of information of a general character, the United States Experimental Stations have done good work in this direction, and from the French colonies specimens of diseased canes have occasionally been sent to Paris to be examined and reported on by plant pathologists. It is probable that additional forms of disease will be described when the cane fields of Fiji, Cuba, and the Sandwich Islands are more carefully examined.

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THE FORTHCOMING MEETING OF THE BRITISH ASSOCIATION AT TORONTO.—The forthcoming meeting of the British Association at Toronto is expected to be held from the 18th to the 27th of August, 1897. The University of Toronto, whose buildings are being placed at the disposal of the Association for the purpose of the meeting, is a State institution founded in 1797. There are two faculties in the University—the faculty of Arts, including Natural Science and Law, and the faculty of Medicine. The School of Practical Science is recognised as the engineering department of the University. The Industrial Exhibition that will be held at Toronto

in August will give the visitor a valuable opportunity of seeing the industrial conditions of the Province and Dominion. The meeting of the British Medical Association will also be held at Montreal in August. It is expected that a large number of foreign scientists will be present at these meetings, and one or more parties will be organized for expeditions into some of the less known or as yet unexplored regions. The Toronto Publication Committee intends to issue soon a Handbook to Canada, giving an authoritative account of the geography and geology of the Dominion, its fauna and flora, the fisheries and mines, the economical resources, the railways and canals, and the Constitution of the Dominion.

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THE NEW PHOTOGRAPHY.—At a recent meeting of the Glasgow Philosophical Society, Dr. Macintyre showed with what rapidity the Röntgen photographs can now be taken. He passed through a kinematograph a film thirty feet long which had upon it radiographs of a limb of a frog, and he was thus able to show distinctly the movement of the bones in the limb. For the purpose of obtaining the photographs the kinematograph was covered with lead, in which there was the usual aperture. This aperture was covered with brown paper. The mercury interrupter was used with a ten-inch spark coil, and the movements of the limb of the frog were controlled by a mechanical arrangement. There are many well-recorded cases of dermatitis due to the X rays. Mr. T. C. G. Gilchrist, who has been engaged in investigating this question, finds that the X rays are even more powerful than is usually supposed, and that their deleterious effects are often serious. The cutaneous manifestations are not the most severe of the lesions, being surpassed in severity by those of the deeper tissues, and particularly of the periosteum and bones. Mr. Gilchrist is of opinion that these injurious effects may be due to the platinum particles piercing the bulb and then attacking the tissue. If the lesion extends at all deeply, it leads to the formation of ulcers, which are extremely intractable, and they may be due, he suggests, to irritating particles still present in the tissues.

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THE CULTIVATION OF OATS.—The Agricultural Association during the year 1896 has been concerned chiefly with the cultivation of oats and the grass crop. With regard to the dressing of oats or their cultivation for seed, it has been proved by experiment that large seeds neither afford any ground for expecting the production of large ultimate plants or heavier crops, nor do they secure earlier germination. They secure, however, the power to reach the surface though deeply sown, and a stronger briard, thus enabling the plants to withstand uncongenial conditions of soil or season at the early stage of growth. A large seed does not, as a matter of course, tend to produce a large plant. Investigation shows that the size and strength of the embryo within the seed does not bear any relation to the size of the seed. Small seeds are often found to contain larger and stronger embryos than a large seed. The extra size of the seed merely shows that extra food is provided for the embryo. The production of a strong embryo seems to depend rather on parental influence, a subject which needs to be further investigated.

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THE NEW ANTHROPOLOGICAL EXPEDITION.—The most elaborate and best-equipped expedition that has ever been instituted for the advancement of anthropology will shortly be sent out by Mr. Jesup, President of the American Museum of Natural History. It will be led by Professor Putnam, Secretary of the American Association for the Advancement of Science. In the course of a seven years' tour it is proposed to visit first the North-West coast of North America, north of British Columbia, following the coast up to Alaska and Bering Strait. Thence it is proposed to cross into Asia, and work down to Siberia, to China, along the Indian Ocean, and into Egypt. Professor Putnam will be assisted by Dr. Franz Boas, who has spent several years among the Indian tribes in the North-West of America. Several years ago, Mr. Jesup fitted out one of the relief expeditions to bring back Lieutenant Peary from the Arctic.

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THE MEMORY OF FISHES.—It is generally supposed that fishes are endowed with memory. Apparently they can recognise people, remember the bait they have escaped, and have some sense of locality. Professor Ludwig Edinger is anxious in the interests of comparative psychology that data of this kind should be collected and compared. He accordingly asks anglers and naturalists to communicate to him any experiences that may tend to contradict, or confirm, the theory that fishes have memory. The function of memory, according to accepted theory, depends on the action of the brain cortex; but fish, it has been proved, have no brain cortex. If they are proved to exercise this faculty, the view that memory has its seat in the brain cortex will have to be abandoned or modified. Professor Edinger's address is 20, Gartnerweg, Frankfurt.

'AT THE SIGN OF THE PAPER KNIFE.'

WHEN I begin to submit my literary conscience to that uncomfortable process known as self-examination, I find I am prone to two cardinal sins, which, if the father confessors of Letters are to be believed, will for ever bar me from the company of the elect. There is no gainsaying it; I find I like new books, and that I am prone to desultory reading. I suppose there has hardly been a Mechanics' Institute opened or a Literary Society urged upon its wild career without a solemn depreciation of the one, and a stern denunciation of the other. Mr. Augustine Birrell, Sir John Lubbock, and the other high priests in the hierarchy of taste, who so kindly select the 'Best Hundred Books' for us, and incidentally suggest the new and non-copyright series to enterprising publishers, will hardly admit an author who has not lain comfortably in mother earth for at least a half century. The scheme of selection seems to follow a vinous analogy. Acceptable authors, it would appear, must have been well matured in the wood before being bottled for home consumption. The banker-poet, Rogers, on being asked whether he had read a certain new book, replied, 'When a new book comes out I read an old one.' This, I am told by the professional advice-givers, is a most worthy attitude. For my part I think it desperately mean. If book buyers are to be counselled to refrain from investing in books until time has assured their worth, how, in the name of fortune, are budding authors to live? I have some interest in the question myself. I have lately discovered many stray leaves of my ill-starred 'Wails of a Wayward Soul' at the butterman's.

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Whether Rogers let the commercial spirit get the better of his literary enthusiasm—for, mark you, the fine frenzy of poesy is not incompatible with, say, a snug business in wall papers—or whether he fell a victim to the seductions of the epigram, is not for me to say. I only dissent from the view. As the rustic remarks, 'I'm not argyfyin'; I'm just tellin' yer.' Then, there is another point of view. Turn into the British Museum any day you like. There you will see the wholesale manufactory of Messrs. Smith & Mudie in full blast. It was so in Chaucer's time :—

> 'For out o' the olde fieldes, as men saythe,
> Cometh all this newe corn from yere to yere,
> And out of olde bookes in good faithe
> Cometh all this newe science that men lere.'

So, after all, in the new books you get the best of the old, refurbished, modernised, in better print and with up-to-date spelling. So for the sake of the minor poet, the needy novelist, and the literary hack, let us stand up in defence of new books. This, I am aware, may be bad political economy, for the authors concerned might often be better employed, but I venture to think it is good philanthropy. I would even implore the cold classicists to buy a new book occasionally, even if they have to do it in the spirit of the gentleman who only paid his tailor's bills under the gentle persuasion of the County Court. As he observed, he had the consciousness of doing right and of giving a lift to the revenues of his country, at one and the same time.

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There may be some hope for the readers of new books, but for those who have acquired the pernicious habit of browsing at large, the gates of the literary Paradise are irrevocably closed. Mrs. Browning has given it as her opinion that desultory reading is the *ne plus ultra* of intellectual idleness, almost next door to what the Americans call whittling. Your mind, and my mind, dear desultory reader, will become a literary dustbin. We shall develop into a species of dipsomaniac. Our resolution and our power of sustained thought will vanish. The time will come when people will pass us by in the street with a shudder, and say, 'Poor things! They were quite respectable before this desultory habit got hold of them.' All of which is so sublime as to be ridiculous. But, as I said before, I am not going to argue. Desultory reading, like

tomatoes, is an acquired taste, and taste, so the proverb tells us, admits of no argument. At any rate in these columns, month by month, I am going to speak of new books and current literary matters in a strictly desultory spirit. My editor takes all responsibility.

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From political agitator and stump orator to official of the Science and Art Department is a metamorphosis that savours of romance, now that South Kensington has become the happy hunting ground of aristocratic cliques and the half-pay captain has turned his sword into a blue pencil and is forthwith transformed into an Art critic of the elementary school. Yet such an evolution once took place in the person of John Buckley, whose autobiography, edited by Mr. J. C. Buckmaster, has recently been published by Fisher Unwin, under the title of 'A Village Politician.' The thin disguise of the title will deceive, as it is intended to deceive, nobody. If one may say it without offence, it is a case of Dr. Jekyll and Mr. Hyde. Mr. Buckmaster's name is honourably associated with the pioneer work of science teaching in this country, and his renown will be rather heightened than minimised by the simply eloquent story of his early struggle and persistent determination which these graphic pages reveal. Bereft of a mother's care in 1822, John Buckley was confided to the rigorous hands of a 'gravy-eyed, psalm-smiting old Calvinist of an uncle,' whose enthusiastic adherence to Solomon's rule made him sib to that gentle pedagogue, Wackford Squeers. The instruments of correction were a heavy dog-whip and a double piece of sash-line with a knot at each end, and poor Buckley could remember on one Good Friday counting thirteen weals on his body, 'mottled with bruises, from dark purple to a greenish yellow in colour.' After an unavailing attempt at suicide, he took to agriculture in the valleys of the Chiltern Hills. 'Twice a week I had to turn a small barrel-churn, but if elfins or witches were inside, the butter was a long time in coming, and warm water had to be poured inside to drive them out. They are now expelled with a thermometer.' Later on he was promoted to the plough. 'To ride a mule or a horse in the grey twilight, with a long whip and a bag on one hime, with a bacon dumpling and a chunk of bread, and on the other a small wooden bottle of small beer, was the perfection of happiness.' His labour brought him two shillings a week. 'Now and then I came across a partridge's nest. This,' he adds significantly, 'was the most sacred thing on the land. I was told if I touched one I should be transported for life.'

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The boy's life was hard, but he seems to have been preternaturally observing, and to have found much of interest to store up in his memory. There were the perpetual feuds between the men of Norcot and those of Claybrick—Homeric contests between the local Montagues and Capulets, at which the curate in charge was present, giving friendly suggestions and hints through the parish clerk to the champions of his village. There was the growth of Methodism in the village to note, the stealthy meetings in cottages, where the labourers made their prayers sitting with their eyes shut, 'so that they could say there was no prayer-meeting because no one knelt.' There was the inevitable shoemaker, 'who had gone deeper into Arminianism and politics than any of his fellows, and who used to make uncivil remarks about the landlords, the House of Lords, the House of Commons, the new poor law, bishops, parsons, corn laws, the church, and class legislation.' There was the surging spirit of resistance and unrest that broke out in incendiary fires, noisy demonstrations, and secret societies. Once the shoemaker took Buckley to an open-air meeting designed 'to put an end to tyranny and rotten boroughs and landlords.' The proceedings were of the Hyde Park order, and the banners were blazoned with such devices as 'No pensions for royal concubines,' 'Down with the House of Lords,' 'More pigs and less parsons.' In 1833, when Buckley left the village and became apprenticed to a carpenter in Oxenbridge, he was more and more brought under the influence of the politically disaffected. Once he earned a shilling by scrawling on a gate, 'No Dook of Cumberland shall rain over us.' With a number of young comrades he ardently embraced the principles of teetotalism, and found many opportunities of airing his youthful eloquence at temperance meetings. The charms of a pretty Quakeress led him to the Society of Friends, but it was the influence of an old soldier that induced him to ask a bookseller for a copy of Paine's 'Rights of Man.' 'I should like,' said the worthy bookseller, 'to give you your rights with a horsewhip.'

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On the second occasion when the harshness of his master made him a runaway apprentice, Buckley managed to elude discovery. As a competent workman he now had considerable independence, and was able to move about from place to place. When the agitation for the repeal of the Corn Laws became general, Buckley threw himself into it with ardour. On one occasion he challenged Mr. Pipkin, secretary of the Protection to Native Industry Association, to a public debate. By the exercise of his keen mother wit, he routed his opponent's position, and became something of a local celebrity. It was not long before Buckley gravitated into the position of paid lecturer in the Anti-Corn Law cause. Thenceforward, until close on the Repeal, he was thick in the mire of political life. Lord Morpeth, attracted by his talents and power, advised him to eschew politics and turn his attention to the growing cause of public education. 'This,' says Mr. Mundella, who contributes an appreciative introduction, 'he did with marvellous energy and success, and this was the turning and perhaps saving point of his future life.'

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Buckley was advised to undergo a course of training in an institution largely subsidised by his patron. It is possible that the institution may be identified by some of the 'Old Guard' from the following description :—

'*A Training College in* 1845.

'I passed through endless cabbage gardens to what was called a square, a triangular piece of ground surrounded by quaint old houses and shops. And a few yards from the extreme point, facing the Thames, was a large square house, standing in about two acres of ground ; it had a large garden with several large cedar and other trees, and had once been the residence of a wealthy city merchant. It was now called a College. It was pleasantly situated, and inside there was evidence of comfort and substantial workmanship.

'On my arrival I was received by the head of the Institution with every expression of good fellowship. A number of curious-looking young men stood staring at me as if I were a new curiosity. One of them, who afterwards became a parson, was called to show me over the buildings and then bring me back to the Principal. I saw the printer's shop, the carpenter's shop, the smith's shop, the class-rooms, the dining-hall, the library, the cubicles or sleeping berths, and the lecture rooms. I was then taken to the practising school, where the men were giving object lessons. The garden was cultivated by the students, under the superintendence of a manciple. Three times a week a drill sergeant came from the military hospital. I happened to be present just as the students, about forty in number, were ordered to fall in, and I never saw such a miscellaneous collection. Some men were over six feet, others were dwarfs ; some grey-haired, and others lads about sixteen ; and all rather poorly dressed in seedy black and white chokers. None of them, fortunately, had any idea of my former life, but in the course of conversation I found out that they were a mixture of all sorts ; clever lads from pauper schools, under-butlers to deans and bishops, footmen, Sunday-school teachers, drapers' assistants, tailors, clerks, and a few mechanics.'

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Buckley's life at this institution was often peculiar and painful. When the college was put under a Church principal, Church History was made an important part of the curriculum. *Apropos* of an examination in the subject, an amusing incident occurred.

'*The Wrong Text Book.*

'The Principal was intent on Church doctrine and history, of which I knew little. All the books in his library on the subject were taken away a few days before the examination. Fortunately, as I thought, I had picked up a ninepenny history of the Church at a bookstall likely to be of service to me. When the list came out after the second examination I found my name was omitted. This was a surprise.

'The Principal sent for me and asked what I meant by saying that the character of Cranmer was unworthy of admiration ; he ought not to have been burned, but ought to have been imprisoned ;

that Parker was consecrated after dinner at a public-house in Cheapside by a person who had no authority to consecrate him, which threw doubts on apostolical succession. These—and some other observations about Wickliffe being disappointed of a Fellowship—were too much for an Anglican Principal. Where had I obtained these ideas? I told him that I got them from a Church History, which he desired me to produce. I fetched the book, and as soon as he had looked at it he threw it on the fire. He asked me if anyone else in the place had seen it. I replied, "No." He said it was a tissue of popish lies, and he was hurt beyond measure that such poison had been introduced into the place. I replied that it seemed a much easier Church History than those in the library, and that was why I purchased it. How there could be two histories of a church was beyond my understanding. I pleaded pure ignorance as my excuse for giving pain to one whom I would not knowingly hurt or offend.

'The dinner-bell rang, and as I left he said, "I won't trouble you to attend my Church History lectures again."'

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As a promising student, Buckley was selected on one occasion to assist the Poor Law Inspector in the examination of a large pauper school. The picture he draws of the place, and of the treatment of the children, is painful in the extreme. Shortly after his essay in inspection, cholera broke out in the place, and twenty-five children died within an hour. The head of the place was put on his trial, but, of course, acquitted. The strain, however, broke him down, and he died soon after, a perfect wreck. 'What had brought about this change? The four-and-sixpenny greed, the desire to make money out of the flesh and blood of poor children who were under-fed, insufficiently clothed during a severe winter in fustian and calico, because it was cheaper than flannel; condemned to breathe an atmosphere saturated with poisonous germs, which their imperfectly nourished bodies were unable to resist, when death in its most repulsive form came early to their relief. I remained three weeks, until only thirteen children were left whom no one owned. When the children had left, a detachment of navvies arrived to clear out the ditches and open sewers when there was no one to die. I had no opportunity of judging the educational attainments of these children; I have no doubt they corresponded with their physical condition. The teachers were a poor lot, but quite equal to their salaries. If they had failed in everything else, they would probably have passed excellently well in the Catechism.'

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On his return to the Institution, Buckley took up science teaching, but was soon selected by the Home Secretary for appointment as schoolmaster in a juvenile convict prison. The place was governed by military discipline; boys were triced up to the triangles and flogged, and rigid repression of the cruellest kind prevailed. Buckley soon saw that under such a system his efforts were wasted. As an old platform man, it was impossible for him to refrain from addressing the public on the abuses he found. His newspaper articles resulted in dismissal, whereupon he returned to the college and once more engaged in science teaching. A new Principal, who knew not Joseph, arrived on the scene, and there was constant friction between the old masters and the new head. The Master of Method was ousted, and was succeeded by 'one of the most contemptible, hypocritical, lying creatures that ever walked on two legs.' When Buckley speaks of this person, his language, like that of Bret Harte's hero, is 'painful and free.' 'When he spoke to a female teacher he used to put his arms round her and express his fatherly affection for her temporal and spiritual welfare, and a good report from Her Majesty's Inspector. When the *Non Nobis Domine* was sung he turned up the whites of his eyes. He used to tell us how he had risen before daybreak to read St. Chrysostom and other Fathers in the original, when I knew—and everybody knew—that he was unable to translate correctly a simple sentence in the Delectus. All this was received at the table with wonder and admiration, chiefly from the artful way in which he used to tell the story. His mouth opened like a crocodile's, and he ate and drank like a pig. I have had serious differences with men, but I hated this man. When I saw him walking about in clerical black and a white choker, with his hands under the tail of his coat, I felt what joy there would be if I could only kick him. His great recommendation for model master was his sound views on all Church matters.'

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Eventually, Buckley was wormed out of his post, and a time of hard trial followed. In after years, when he was ordered to visit the Institution officially, he excused himself on the ground of his former connection. The truth was, that he could not have trusted himself to act justly. The persecution of the Principal followed Buckley into the Trade School, in which he was appointed Science Master. Happily, the miserable attempt to injure him entirely failed. When the school closed, Buckley obtained one of the newly established science scholarships at the School of Mines. His career was distinguished and, ultimately, he was appointed to a permanent post 'in one of the Education Departments of the Government.' On the eve of his appointment, the Principal turned up with the scandals and insinuations of former years. They were met satisfactorily, and from that time Buckley was at peace. 'The other model creature went on and prospered for a time, because he was a genius in his art. The Archbishop gave him a degree without examination; he was ordained, and obtained the appointment of Principal to a mixed training college. He was received by the committee as a kind of superior angel.' His angelic character was, however, soon in doubt, and poetic justice was ultimately satisfied, for the man's propensity to scandal-mongering got the better of him, and the Education Department said in effect to the authorities of the College, 'You retain your Principal, and we withdraw our grants.' Buckley last saw his *bête noire* in the capacity of a needy borrower of loose half-crowns. Mr. Buckmaster has given us a strong, incisive book with the impress of a virile mind, and a keen, indomitable nature on every page. There is almost a pathetic ring about the studiously simple prose in which it is written. One leaves it with admiration for the reformer 'who was not afraid to sow the good seed in the teeth of many a wintry blast.'

J. Edward Parrott.

Specimen Lessons. By A. Sonnenschein. London: Swan, Sonnenschein & Co.

To read this latest outcome of Mr. Sonnenschein's unflagging zeal in the interests of intelligent teaching is a very refreshing task. From start to finish we hear nothing but the true ring. Were we to start quoting we should monopolise the whole of the space set apart for reviews, so plentiful are the *bonnesbouches* in Mr. Sonnenschein's feast of rationalism. Yet the book is a little one of only four chapters and 68 pages. The chapters are: I., On Methods of Teaching; II. On Lessons and Lectures; III. Ten Leading Maxims to Good Teaching; IV. Specimen Lessons (all by-the-by on mathematics). We heartily commend the booklet to the notice of all teachers who are interested in intelligent methods of teaching.

Royal Arithmetic for Evening Continuation Schools. London: Thomas Nelson & Sons.

A very numerous collection of arithmetical examples, beginning with vulgar fractions and extending to proportion and percentages, conveniently arranged in one hundred exercises, and clearly printed on good paper. Hints for working, and model solutions by the method of unity and by other methods, are given at the introduction of new rules. The notation of decimal fractions and the details of the metric system are remarkably well-explained in a brief space on pages 60-64. The answers are bound up at the end of the volume. The work is exactly suited for use in Evening Continuation Schools.

Extracts for Parsing, Analysis, and Paraphrasing. London: McDougall's Educational Co.

This book, as its title shows, is a collection of extracts from standard writers, affording many and varied exercises in Analysis and Parsing. A useful introduction deals with some of the difficulties usually encountered by students.

Union of Practical Teachers at Swansea.

THE TWENTY-EIGHTH ANNUAL CONFERENCE OF THE NATIONAL UNION OF TEACHERS, HELD DURING EASTER WEEK.

THE PRACTICAL TEACHER AS DELEGATE.

WITH the knight of the chalk and duster as he is in school we are all well acquainted, but not all of us have seen him in the Conference Town and on the conference platform. From Maundy Thursday up to Easter Monday the captains and guides of Young England were wending their several ways Swansea-wards until by noon on Monday close upon a thousand pedagogues have foregathered in the town of metal and grain. A mere glance at the town suffices to show with what enthusiasm the Swansea branch of the teaching profession has devoted itself to the agreeable task of acceding a hearty unmistakeable welcome to the stranger within its gate. Not only flying banners but also honied words from the Welsh notables assembled in the Albert Hall to do honour to Didarkulos, who is content to 'scorn delights and live laborious days' for the good of his fellows and of his scholars.

A detailed chronicle of the sayings and doings of Conference is not their aim. Rather would we strive to put before our readers a picture, however imperfect, of Didarkulos in conclave assembled.

In the Conference Room.—Here we have many humorous and just as many characteristic expressions thereof presented to us. The respectful attention accorded to the Welsh notables who bid welcome to the delegates is in sharp contrast with the almost delirious appreciation culminating in 'For He's a Jolly Good Fellow,' when 'Mac' the youngest, and in many ways the best president to pass the chair is on his feet to return thanks for the vote accorded to him by Mr. Bowden and Mrs. Burgwin. Greybeard again becomes young and not content to shout, and song waves his agenda as was his boyish wont. The man who can thus move such a concourse is not ordinary. Just previous to this we ask the loyal dominie, who votes an address to Her Majesty and sings 'God Save the Queen,' as it will be sung any time between now and June 22nd. But respectful attention is now the mood as President Addiscott runs through his long yet interesting address, at the conclusion of which we receive deputations and speeches from Irish, Scotch, and Belgian delegates. Then comes the suggestion that the Penrhyn miners should be assisted by a grant of £150, which was adopted on Wednesday, thus showing how deeply the worker sympathises with his poorer fellows when they are subjected to injustice.

Then, again, look at the faces of the men and women as the question of electoral districts is discussed. Not much holiday appearance now, but rather the expectant, suspicious, alertness of the man who has much at stake. When at the next session a poll is demanded, and the ballot boxes have received their load, the thumping and the singing, the bustle and the din, only attest more completely how great the strain really is. And what a shout rends the air when the victory is assured, and we have divided the country into twelve districts, each of which is to return its three members to the Executive. Soothly it would cause the aforesaid Young England some large amount of eye-rubbing were we to hop upon his particular captain and guide in this hurly-burly.

Prior to this, the declaration of the results of the election had caused the same ebullition of feeling as this or that candidate is declared to have been successful or the reverse. We need say no more in proof of the fact that the study of the teacher delegate inside the Conference chamber evinces assiduous attention, conspicuous interest, and enthusiastic turbulence, when occasion demands it.

Outside the Conference town.—Here the teacher delegate is seen under many different guises. Note him in the Publishers' Exhibition, where, collected together from the four quarters of England, are to be encountered books, stationery apparatus, and furniture, in the examination of which the delegate fades slowly from view, and lo! before us is the teacher, keen upon the selection of tools for the due performance of his *métier*. Shall we be reproached when we say to that, in the more rollicking mood of the Conference Chamber, which we have won, is to us more delectable than this lapse into the schoolroom attitude. It is evening, and the evening of college gatherings. In the political clubs—thrown open to us by the courtesy of the members thereof—and elsewhere are to be found Tom, Dick, and Harry, met together after it maybe a parting of ten years. Here the prevailing mood is delightful, satisfaction finding vent in song, sometimes of high artistic merit, for your schoolmaster can not only give a good account of himself in debate, but his musical capacity is such as to demand the highest respect. We love to dwell upon the teacher at his college *réunion*, where nothing is remembered except that 'we be brethren.' Yet another phase presents itself, when we on Wednesday evening accept the Mayor's invitation to a reception in the Public Library. Here the dominie shows himself the man of refined manners, able to assist with credit and distinction at 'society functions,' whilst, running away from the library to the Albert Hall, which for the nonce has been transformed into the court of Terpischore, we view another transformation, the sober pedagogue becoming the gay votary of the light fantastic, which further part he plays right yeomanly.

It is Thursday afternoon, and President Addiscott has thumped down the silence demanded, being for the last time. We are to hear no more of 'the parting of the ways,' which phrase of our President's speech has dangled itself before us repeatedly during the week. Again the delegate makes a quick change and is to be seen, full of the milk of human kindness, as he was on Monday evening, when he sat discussing the management of his charities until close upon 11 p.m. Now his interest is even keener, and with kindling eye he cheers to the echo when he learns that the Birmingham Trophy has been won by the West Lambeth Association, and the West York Shield has gone to the Chepstow Association, and that the total amount which benevolent activity has secured for the orphans of his dead and gone comrades and for his revered seniors of the Old Guard has been £10,700, surely his feelings here are mixed. He thinks on the variety of things human and mundane, how this one died in the plenitude of his powers, and how the other at last is compelled by old age and weakness to take refuge from school worries, maybe in the workhouse, and of the pension so long in coming, and his jubilant attention to Lady Jersey is tinctured with a *soupçon* of sadness.

And then he rushes for his train, or remains for his excursions, counting up the gain, and singling out for special regard the radical change in the constitution of his executive, as will be produced by the new method of election, and he muses upon the mouths likely to be filled by the £150 voted to the Bethesda miners, these two achievements of the Jubilee Conference standing out most prominently in his mind. And whether he goes home, or whether he remains to experience further hospitality at the hands of the men of Swansea, he thanks God for his Union, and vows to himself that he will ever fight to make it an even more potent weapon for good. And then homewards he goes, to be found at the Board on Monday, all the better for the various metamorphoses that Conference has brought about in his state of mind.

THE PRESIDENT'S SPEECH.

The Criminal Waste of Educational Effort.

As a teacher speaking to teachers and to others interested in this 'first of national objects,' a sound system of Primary Education, I wish to take the opportunity to discuss a few of the questions which, at the present time, are of pressing and paramount importance. I give the first place to the enormous—the criminal—waste of educational effort of which we, as a nation, stand convicted with regard to the children who are allowed to drift away from our schools between the ages of eleven and fourteen, thousands uncivilised, and tens of thousands uneducated. Our work compels a recognition of this serious blot upon our educational escutcheon, and to arouse public attention to it becomes a positive duty. Thirty years ago we had to face the problem—how to get every child into a school; to-day we have to ask—in what condition shall we send every child out of the school?—a question to which a satisfactory answer has yet to be made. One of the glories of the reign which, this year, we do well to celebrate, is the fact that for every child in the kingdom a school place is provided—6,000,000 of them, in round numbers. Upon the school roll—that is, upon paper—we find 5,326,000; we shake hands with ourselves and cry out for an advanced secondary system. Leave the registers and look, on any one day, for the children—1,000,000 disappear. The average attendance is 4,346,500; therefore, of every 100 places provided, 27·5 are empty, while for every 100 who *are* brought over the threshold of a school, and for whom an expensive educational machinery is provided, 18·4 are daily absent, and absent to become—what? Truly, for the nation, a vital question. To add emphasis to it, we have to examine the ages of the absentees. Speaking generally, a child up to the age of seven is learning the use of its five senses, and onwards to eleven is merely gathering together educational tools for future use. After the age of eleven he begins to see that all this has an object, may even have something to do with his future, and with that process of 'getting on' of which he is beginning to hear. Self-development starts, and the formative influence of all that surrounds him begins to tell. His environment and his adaptability to it, upon which his whole future will depend, become the all-important factors. He comes to a parting of the ways; for him it may mean either a life of usefulness, and therefore of happiness, or a life on the down grade, involving himself and others in misery. *Is it not appalling that of the 5,326,000 no less than 4,000,000 take the wrong turning?* . . . .

The Effects of Our Present Policy.

. . . . The child, under parental recognition and encouragement, too often the result of parental greed, helped by inflexible, iron-bound regulations, and by a sympathetic magistracy, becomes an incipient law-breaker. I quote Mr. Morrison's latest book, 'Juvenile Offenders': 'A disposition to evade parental and scholastic authority, showing itself in vagrant habits, may be considered as being, in many cases, an initial step towards the complete evolution of an anti-social life'; and he emphasises it by the fact that only 13 per cent. of the children sent to reformatories had received an elementary education either in *Church* or in *Board* schools. This is the class that clogs the feet of the nation's progress. . . . . Under advancing education we are proud to point to evidence of a decreasing number of criminals, but by the side of this there are two facts of a very serious nature—one, an increase in the number of

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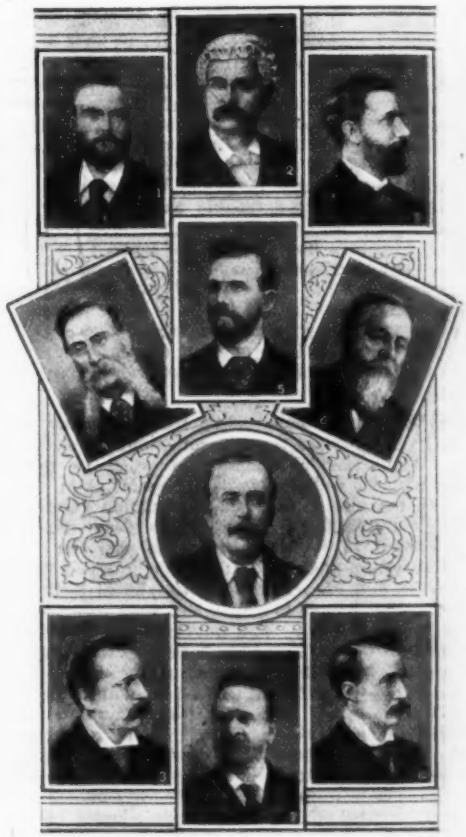

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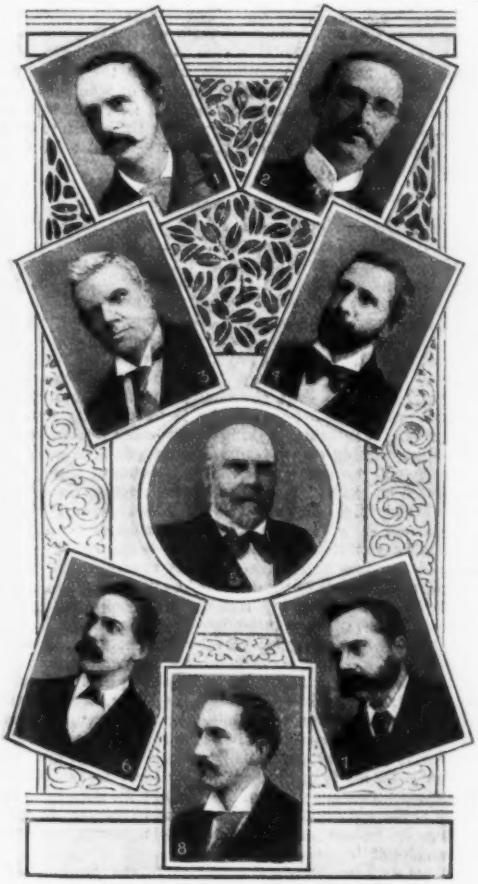
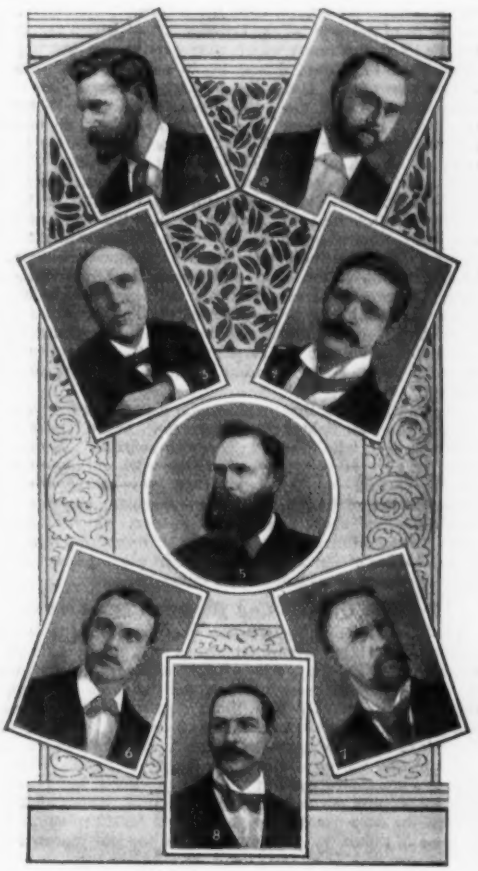
10. Mr. A. A. Thomas, B.A.

those who are *habitual* criminals, who are the greatest danger to society, and who, in order to qualify for this class, must have begun early in life; the other, the enormous increase in the number of children committed to industrial schools. In 1887 in Great Britain these stood at 8,778; in 1880, 16,446; in 1890, 22,735; and in 1894, 24,683. The truant is in bad company, he becomes the loafer, and almost of necessity the thief; for a long period of non-detection is only secured by not going home, and, thanks to the vicious habit of shopkeepers in loading their shop exteriors with unprotected goods, theft becomes easy. If driven into school for an occasional attendance in order to avoid or soften the result of a summons which after twelve or more months' threatening has become a reality, he is then incapable of continuous application, and to attempt to reform him through the intellect would be as futile as to place spectacles before sightless eyes. In the last report of the Feltham Industrial School, I find that 'out of 263 boys admitted in 1894, 67 had to be placed in the first or lowest standard, many boys of 12 or 13 not even knowing their letters,' and further I read 'there is considerable difficulty in showing satisfactory educational results owing to the complete neglect from which many of the boys have previously suffered,' and *we boast the possession of a compulsory Education Act a quarter of a century old.* These boys have spent the most precious years of their life in playing hide and seek with the attendance officer. . . . . In one case the magistrate, Mr. Kitson, had before him three boys for theft; two, aged nine and fourteen, were sent to industrial schools; for the third, aged fifteen, he 'much regretted that he had not the power to have him flogged.' He thought it would be a great advantage to the public if he had the power. 'Someone would be doing a public service in taking the matter up.' . . . . In 'Crime and Its Causes' I find this statement: '50 per cent. of adult criminals become corrupted before the age of twenty-one, and we may conclude that numbers of juvenile law-breakers are not detected until past reformatory school age, and have become so hardened in vice that they would with difficulty become reformed by any means.' . . . . There is one factor in this question—viz., parental neglect—upon which the report of the Society for the Prevention of Cruelty to Children throws a lurid light. It has been found necessary to deal with the cases of no less than 52,871 children in one year. So bad are some of these that an aggregate of 398 years' imprisonment has been distributed among some 2,000 vicious parents.

CHIEFS OF LOCAL CONFERENCE COMMITTEES.



1. Mr J. Rhys Davies.
2. Mr. J. Evan Jenkins.
3. Mr. T. Roland Richards.
4. Mr. David Davies.
5. Mr. Thomas Roberts.
6. Mr. J. J. Chappell.
7. Mr. F. C. Way.
8. Mr. F. D. Colmore.



1. Mr. H. Roland Wakefield.
2. Mr. T. H. Morgan.
3. Mr. John Williams.
4. Mr. G. H. Crews.
5. Mr. J. W. Cadwallade.
6. Mr. Harry Watkins.
7. Mr. E. R. Ridges.
8. Mr. John Williams.

The Case of the Child Labourer.

Our eyes are further opened by facts disclosed in connection with child-labour in the North. The operatives of one town alone, Oldham, put away £200,000 for the annual wakes holiday, while they sent their little eleven-year-old offspring into the mills to help earn it. . . . . In Sparta the weaklings were exposed on Mount Taygetus until they left a world that had not proved kindly. In England we kill them by inches, and we do it in the interest of trade and in the fear of German competition, oblivious of the fact that—and here I quote the recent report of Sir Philip Magnus—'Child labour has practically disappeared in German factories.' . . . .

Practical Remedies Suggested.

I would suggest as practical remedies:—

(1) The attendance officer to have assigned to him an area of supervision sufficiently narrow, and a salary sufficiently broad, to

enable him giving his whole time to the work, to do that work efficiently.

(2) The legalisation of an experiment already attempted in Hackney with marked success until discovered to be illegal, viz., a special Justice of the Peace for school attendance cases, in a building other than a Police Court.

(3) That the maximum penalty for non-attendance be raised from 5s. to the £1 of the Scotch Act, and that, when imposed, in should, in one shape or another, be enforced.

(4) That the attendance orders, once obtained, should hold good in the district to which the child is often removed in order to avoid it.

(5) Penalising the employment of any child who does not produce a leaving certificate.

(6) The abolition of half-time.

(7) Summary powers to be given to school authorities to take the young old-offender from the streets and to lodge him in the truant school or other suitable place, not for three months, as at present, under a discipline described by the member responsible for this department of the work of the London School Board as one which the truants liked and under which they were happy, but for, say, three days, which three days should be to him, for ever afterwards, an abiding memory. Make the penalty cumulative for subsequent offences, and in all cases the parent to be made to bear the full expense of maintenance. We should then hear no more of overcrowded truant-schools. We should not meet such a belated proposal as this: 'The School Management Committee of the School Board for London recommended that the Industrial Schools Committee be instructed to consider and report whether the management of the truant schools is not such as to defeat the object of the schools, and, if so, what changes the Committee propose to make in order to render them institutions for checking truancy'—rather late, this, for institutions which, for so many years, had been supposed to be 'going concerns' for checking truancy. From Plymouth we have this interesting item: 'The report of the Truant School Committee of the Board shows an alarming increase in the number of truants since the abolition of corporal punishment on re-admission. Nineteen months' moral suasion has filled the truant school to overflowing.'

(8) I also suggest that youths under sixteen on first conviction in a police court for lighter offences, be sent, not to a reformatory, but to the parents, who should be made responsible. Now, in all this I am not advocating cruelty, but rescue work of the noblest kind, of that prevention—which is better than cure—of the cruellest of all lives—the life of the criminal and the outcast. We want a method which shall be short, sharp, and decisive, which will practically break up the criminal class by cutting off its supply, relieve the State of the burden of its expense, and in its place present to the State honest producers and law-abiding citizens.

The Question of Juvenile Literature.

In this connection there is one question which, to every earnest teacher, must be of intense interest, and in the solution of which I should like to see this Union of ours take a more prominent part, viz., the supply of good literature for our youth to counteract the vicious and insidious poison, the stream of atheistic, immoral, cheap and nasty, melodramatic thought and teaching which, in the poorer districts of our large towns, is flaunted temptingly in the eyes of the children that we have laboriously taught to read. Time fails me now to adduce evidence of its appalling effects, but I wish to take this opportunity on behalf of the National Union of Teachers to express the deep gratitude which we feel for the splendid work done by several publishers, who have during the last year or two flooded the country with good and cheap juvenile literature.

The Child beyond Eleven Years of Age.

I now return to my figures dealing with school attendance. I have said that drawing the line at eleven years of age we find four millions of children on the school roll at or below that age, while only 1·3 million are on the other side of the line. Allowing for causes which take children off the tables of the Education Department, we might assume that 3½ millions are thus removed before any real education has begun, and I have tried to show that this is largely due to our neglect of the obligations which the 1870 and subsequent Education Acts have placed upon us. To this I have to add the *legalised* evasion of education. It is startling to find that while the Government Code makes Standard VII. the termination of the child's school career, there are only five out of every 100 School Boards in England which make the qualification for exemption from school even so high as Standard VI.; more than 50 per cent. consider they have entirely with the child when it reaches Standard V., and allow him half-time at Standard III. I have now indicated the chief causes which cut off 66 per cent. from, I won't say an efficient, but from even an elementary education, that fill our 217 disciplinary barracks known as industrial and reformatory schools, our eleven training ships, and nine auxiliary homes with 30,000 young souls, 99 per cent. of whom were not inherently bad, and might have been brought under discipline easily enough, but after neglecting them at an early age, we afterwards essay their rescue from the imminent risk of a criminal life; but, alas, for many of these we are then too late. Until we get firmer hold of the child between eleven and fourteen, much of the public effort which before long is to be more widely extended in the direction of higher-grade and secondary schools, must be wasted. We shall be building an ornamental and pretentious structure upon sand, a giant upon feet of clay. . . . .

Overcrowded Time Tables.

This leads me to a word upon two or three other abuses which practical experience has taught me are, to some extent, responsible for the unsatisfactory condition in which these 3½ millions leave our schools, unfit to enter upon the inheritance of an advanced education, which, it is generally conceded, the nation is about to provide for them. I refer, in the first place, to the ever-increasing tendency to overload the school curriculum. The elementary school appears to be the *corpus vile* upon which every educational vivisectionist tries his experiments, and whether it be your true enthusiast and reformer with knowledge, zeal, and opportunity, such as the present admirable Vice-President of the Education Council, or whether it be that much larger and more irrepressible army of false educational enthusiasts and faddists and would-be reformers, the result, to the good ship Primary Education, is equally disastrous—it will sink through sheer over-loading. . . . .

The Teacher's many Rôles.

In a large, well-equipped town school, taught under the most favourable circumstances, a single teacher is confronted with from fifty to ninety children, to whom he, *as a teacher*, is trying to teach twenty to twenty-five subjects; *as a teacher artist*, probably four drawing subjects; *as a mechanic*, say another four, having a choice between paperwork, woodwork, clay-modelling, cooking, the dairy, the laundry; *as a drill sergeant and gymnast* he, or she, is moulding the muscles of the future by physical exercises, military drill, or drill made in Sweden or elsewhere, is superintending marchings or counter-marchings, desk drill, and changes of class, swimming and general gymnastics; *as a registrar* he is keeping registers which are ever growing in intricacy, making hourly, daily, weekly, monthly, annual returns, posting up log-books in which, should he fail in any particular, he will have the compensating pleasure of seeing himself as others see him, in the 'entries of serious defects of discipline and instruction which H.M. Inspector might make,' drawing up periodical syllabuses of work, with brief summaries of the chief oral lessons, and a record-book, with another series of these 'brief entries,' and progress and mark-books as to 'individual conduct, application, and advance of the scholar,' correcting, dating, initialing hundreds of exercise, copy, and drawing-books, filling up, at an enormous waste of time, attendance certificates, he is writing notes to parents, to managers, to school authorities, to medical officers of health, to official correspondents, to visitors, etc. In his sixth *rôle, as a moral agriculturist*, he is sowing habits of thrift by superintending a savings bank, a clothing or a boot club, is inducing habits of study by charging himself with the care of a lending library, and habits of observation by the care of a museum, and is also mindful to inculcate habits of cleanliness, honesty, etc. *As a local tourist guide* he is conducting his children to museums and other local institutions; *as a town missionary* his duty is to know something of the child's home environment, to interest himself in the feeding, by free or assisted meals, the underfed, and, where possible, to clothe the naked. . . . .

As teachers we have interested ourselves in the 30,000 children sent into the country by the Children's Country Holiday Fund; it is then discovered that they want employment when there, and we are asked 'to further interest them in the collection of wild flowers and the making of notes upon them.' *As a sanitary inspector* the teacher stands responsible for 'the room being properly cleaned, warmed, aired; the furniture in good condition, the inkwells stowed away, the water supply laid on,' etc.; *as a patriot* he may be inculcating the duties of a citizen, leading from the known and familiar policeman and rate-collector to 'the history and reason of our national institutions,' teaching 'all about members of Parliament and county councillors' (when I do tell my boys *all* I know about some of them, there will then be a lively time in store for me) and all this without a political conscience-clause; *as a shop-walker* he must 'exercise supervision over the various members of his staff.' The twelfth role this man of many parts may play is that of an *entrepreneur of general amusement*—'dialogues, pictures, and object lessons . . . musical drill, the use of simple tools,' to which he too often has to add the organisation of school entertainments, concerts, etc. Evening classes—yes, there are evening classes on the top of all this—are to be rendered attractive by means of lantern illustrations,

'by field, naturalist, and sketching clubs, gymnastic and other employments of a more or less recreative character,' and observe the *naïveté* of the 'more or less' in this official instruction. My list is not exhausted, but probably your patience is; but I may add, as an incidental detail and an appendix, he is actually allowed to become both a teacher of religion and an educator—if he can get the chance. The first of these duties he fulfils at the call of his own conscience, and as to the second, 'my Lords' tell him to train children in habits of acquiring knowledge for themselves, and in the handling and purpose of books and other instruments required for its acquisition. 'My Lords' are ever ready with the most kindly advice and admonition (indeed it is only when it is a question of a more reasonable security of tenure or of superannuation that they are not found ready); and so also are 'my Lords'' officially appointed Inspectors, although this function of theirs is of strictly modern origin. The Board which he serves and its inspectors, or the managing committee and its correspondent, or both together, are also constant reminders to him of his duty, and should any of these fail he has from 100 to 1,000 parents ever ready to become his guides, counsellors, and most candid friends. I am saying nothing of extraneous tasks, but confining myself to school duties alone, and, I need not tell this audience, am quoting largely from the official instructions of the Education Department. To these must be added the equally official instructions of that inspired Science and Art Department. I quote a few. This, to Standards I. and II., age seven and eight: 'In order to interest the children it is advisable to teach them to draw as early as possible from actual objects such as doors and windows, furniture and apparatus of the schoolroom. It will also be found quite possible and very desirable to go beyond the foregoing standards in teaching. Thus freehand drawing of bold curves may be introduced in Standards I. and II., and exercises may be advantageously given, in all standards, in drawing from memory.' Again: 'It will be found very useful to practise the younger children in cutting out and putting together solid models.' Again, this time for infants: 'Interest may be given to the exercises by making figures or patterns out of the combinations developed by practice, but the main object should be the training of the hand and eye to discern degrees of variation in the straight lines from the perpendicular and horizontal, and to compare and judge the relative lengths of the lines and angles made by their junction.'

Public Men and Pet Ideas for the Schools.

I next turn to our public men, who are equally anxious to make us foster father to their pet ideas, many of them excellent. I sample a few of them. Sir John Lubbock claimed that more attention should be given to English history, geography, and elementary science, and wants three class subjects taught, and in *The Times* in December last insists on modern languages, hinting at Hindustani, Chinese, and Spanish, because the pupils will thereby 'secure good berths.' Mr. Acland regretted that more was not done for dairy teaching or the teaching of cottage gardening in rural schools. He also thought the children should learn more about botany—an excellent idea. Sir Albert Rollit, another good friend to teachers, wants our education to be more commercial; it should include modern languages, a knowledge of ancient and modern trade routes, and special attention to mental arithmetic. Dr. Garnett wants more scientific teaching with careful and accurate measurements. Mr. Diggle thinks 'the time is coming when we shall have to pay more attention to the child's surroundings and social conditions than we have done,' and I quite agree. Mr. Roberts, in *The Contemporary Review*, 'would have teachers pass an examination in children's games.' The London School Board receives a communication from a gentleman who suggests that the art of walking to the right should be taught in Board Schools. Prof. Lombroso, in *The Monist*, says, 'teachers had abundant opportunities of becoming admirable detectives of the incipient criminal,' and recommends his utilisation in that direction. Another wants patriotism and the Union Jack to be our leading article. A coroner, Mr. Cartar, during the inquest on a baby who had failed to live on beef tea, said, 'it was a great pity that girls were not taught how to feed and bring up babies.' I do not know whether the publishers have thought of the matter with a view to finding a market for the supply of the raw material. The last Co-operative Congress condemned the Government for not putting Co-operation into the Evening School Code. The Temperance Society is anxious we should inculcate its principles, have its books read and its essays written — we do our best. The Society for Prevention of Cruelty to Animals follows suit, and again we try to oblige—both ideas being excellent. A few weeks ago Mr. W. Johnston in the House of Commons asked the Vice-President of the Council whether 'by introduction in the Code or by instruction to the teachers, attention would be directed in all schools to the events which had occurred throughout the Empire during the 60 years of Her Majesty's reign, with special reference to the extension of her dominions and the moral and material advancement of her people'—a form of patriotism which is extremely cheap to the honourable member, and shows the extent of the knowledge of the average school child of age, say, from six to eleven. We thank Sir John Gorst for his reply on that occasion, 'We have sufficient confidence in the loyalty and patriotism of the teachers.' When will it occur to an M.P. to go into the nearest school, tackle the lower division on the subject of the extension of Her Majesty's dominions, etc., give himself a week of it, and then bring forward his proposals.

Suggestions by the Daily Press.

It is not to be supposed that the daily press would be behindhand in its solicitude for the teacher's usefulness. Again, I can only give one or two samples. *The Daily Telegraph*: 'Schoolmasters cannot better employ their time during holidays than by a careful perusal of the code of rules for the prevention of infectious and contagious diseases in schools.' *The Fortnightly Review*: 'Schools should be divided into the house system. One or more teachers would then be responsible for a house, and it should be their duty to organise cricket, football, hockey, leap-frog and other games, drilling and gymnastics, besides concerts and entertainments.' From several papers: 'Waterloo was won (this is the favourite way of putting it) on the playing fields of Harrow and Eton, therefore physical exercises must loom large in the school time table.' Before the next Conference we shall, perhaps, have a proposal for which I have been long expectant, which would bring many of these suggestions into harmony, viz, the legalised abolition of all parental responsibility—for evidently it is a thing that has ceased to exist. To every inventor of a new pill it would be good advice to tell him to try it on an inferior animal. Our educational reformers bring their specifics and try them on young children not their own. The crop of suggestions is still growing; some are mere weeds, many are valuable plants so thickly set in the soil that they destroy one another, while the soil itself becomes exhausted. I quote Mr. Acland apparently against himself in *Nineteenth Century* Magazine for October last: 'Any sacrifice of such thoroughness in the elementary school for the sake of a little science, or a little cookery, means a corresponding future sacrifice both of the time in the evening continuation school, and (which is more important) of the inducement to attend it.' Especially do I recognise in the Education Department's requirements the evident desire to see the primary school at its maximum of usefulness, only there is no 'drawing to scale.' 'For twenty-five years,' said Mr. Mundella to the House of Commons, 'each succeeding Vice-President has loyally endeavoured to improve education.' This is true, but to improve here means 'to add to,' and translated into practice comes to this result, that so many wheels and levers and checks have complicated the machine that, although the Departmental penny goes into the slot, the machine doesn't give the output expected of it. 'Misdirected effort,' Huxley once told us, 'beats gunpowder hollow as a destructive agency.' And what is it we are destroying here? It is the old ideal of education for its own sake.

> 'To know:
> And that this aim shall differ from a host
> Of aims alike in character and kind,
> Mostly in this—to seek its own reward
> In itself only, not an alien end
> To blend therewith.'

The Aim of Present-day Education.

Education is no longer looked upon as a tool to aid self-effort. Everything must now be done for the child. With a little knowledge of many things, taught him from the utilitarian point of view, he leaves school for the inevitable disillusion. He finds he has learnt little to any practical purpose; it is all surface, no depth. Education is looked upon as a means of livelihood, and not as a means of life, with the result that it becomes neither one thing nor the other. We forget two factors—constant, inevitable. The first is time. I have already shown that one-fifth of the children being always absent, the normal sixty minutes' hour is for the teacher reduced to forty-eight. H.M. Chief Inspector for England gives it as his opinion that 'the average duration of school life in England was the shortest on record of any nation,' and he is speaking of the period during which the child's name remains on the books. Where are we, then, when we have to further reduce it by a fifth? The second factor is the child-mind, and here, again, it is the opinion of experts upon the subject that we must also make a deduction in any comparison with previous epochs. To use Macaulay's simile, we sit upon the shoulders of the great thinkers and workers who have gone before, and we say:—'See how tall we are!' and we say it so often that we get to believe it.

The Condition of the Teacher.

In all I have said on the subject of increasing school requirements, I have omitted reference to its effects upon the teacher, upon the fact that this encyclopædic life of his is lived upon a salary which,

as I heard Mr. Lloyd-George, who fought so gallantly for educational principles in the discussion on the Voluntary Schools Bill, tell the House of Commons, 'honourable members would scorn to offer to the trainers of their race-horses.' It is for men £2 7s., and for women £1 11s. per week. A fortnight ago Sir John Gorst told the House 'it was no use lamenting over the cost of teachers.' Isn't it? I venture to think it is; the lament being that the cost per teacher in the terms of salary is so miserably small. He added: 'People may think that teachers are not worth the money they receive.' Well, no one knows better than he that to ask people to think is just the very last demand that should be made upon them; but for those who are inclined to undergo the process may I ask that, over against the munificent (?) salary named, over which it is so useless to lament, may be placed the consideration of the duties—the demands made upon muscle, brain, and heart—which I have feebly tried to sketch. Nor have I said a word upon tasks, extraneous even to those I have named, and for which he is not paid at all, and for the non-performance of which he may, at any time, be turned adrift, professionally ruined by irresponsible management. I have been concerned simply with the children, my object being to show that if the educational output is not all it should be, the fault lies not at the door of the teachers.

The Pupil Teacher and 'Art. 68.'

I now come to a second reason for lessened educational efficiency—the employment of unqualified teachers. We feel deeply grateful for the improved position which the pupil teacher now occupies in *our large towns*. To the benefit of the school and himself, he is no longer held responsible for any section of a school. He goes to his training college better equipped as a pupil and less exhausted as a teacher, reaps a larger harvest from his two or three years' training, especially if it is in a day or other training college affiliated with the university, and he finally goes to his life's work, not necessarily in the town which has more freely spent its money upon him, but it may be in a rural district which is, in this way, saved from the consequences of the neglect—too often, I admit, unavoidable—of its own raw recruits who enter the educational army. London alone is in this way doing much to restore the balance between town and country. Outside the large towns, however, all this is changed Sir John Gorst was right when, at Cardiff, he declared that 'the poverty of the country schools had driven them to run the schools with cheap child labour,' and, further, 'these child labourers were mere school drudges'; that 'their employment was the most extravagant form of economy.' Statistics show that it is in our large towns alone that the children are saved from a teaching which is itself untaught, empirical, inefficient, and from which nine-tenths of our schools need deliverance. It is our duty as a Union of practical teachers to suggest remedies; we have done so in our scheme of student-teacherships, which no doubt will be duly considered by the Departmental Committee now sitting upon the subject. We look with confidence to a successful result of its deliberations. Among the 39,639 teachers employed in England and Wales, and classed as uncertified, we touch the lowest depth in the 11,678 teachers employed under Art. 68 of the Code. The School Boards, having no plea of poverty to urge and boasting of the superiority of their educational results, employ 2,191 of these teachers; the Church of England and Roman Catholic schools, who in their turn boast of the superiority of their religious instruction, have that superior religious instruction imparted by no less than 8,538 of these unqualified and, to a great extent, inefficient teachers. The pupil teacher gives us at least some guarantee of training, and has seriously entered upon a profession in which, in order to succeed, he is prepared to make sacrifices; but our Art. 68 is superior to all these considerations. She—for no degenerate 'he' could ever attain to the position of a teacher by mere age and intuition—leaves school as a child, spends the next five or six years in a way that may have no connection with study, school, or teaching, and at last reaches the one qualification—inevitable if she only live long enough—required by the Article—*viz.*, the age of eighteen; and thus, either because she is cheap and the school is poor, or because she is the relative or the *protegée*, or is useful to the manager or board member, she enters a school in which children will become the victims of teaching which, again, is itself untaught, inefficient, makeshift. We have been told that these teachers are often good, or good enough, for the lower standards of a primary school. I admit that here and there are found successful pupil teachers insufficiently gifted as students to pass the Scholarship Examination, but who may exhibit exceptional qualities in the treatment of young children; but the fact remains that we take no guarantee that they might have received any professional training whatever, and even if good, surely would be the better if to their natural teaching abilities were added a knowledge of the technique of the work in which they are engaged. Having once failed in the examination, there might be no objection to their retention until they have made a second attempt under Art. 41, but after the second failure they are manifestly unfit. . . . Let us at once either guarantee the training and efficiency of every teacher, or cease whining about the inferiority of our educational results as compared with those obtained in other countries, where the untrained teacher is unknown. I have not hesitated to trouble the Conference with this matter, because I feel that under the Special-Aid Grant, recently devoted to denominational schools, the number of those unqualified teachers will double itself in the next three years. While under Federations, with limit to grant gone, the tendency will be to insist upon the maximum grant upon the maximum number of subjects, and with this tendency on the one hand and the growth of the unqualified teacher on the other, the teacher's position will become almost untenable, and to me that is one of the blackest clouds on the professional horizon.

The Elder Child at School.

I have been dealing with the weak spots in our primary school, with special reference to children up to the age of eleven. Advancing another year (age twelve) we have to see disappear from school another half-million—to be exact, 556,820. Of the three-fourths of these who have attended regularly, it might be said that they carry with them a moral training based upon Bible teaching and a disciplinary training of the highest value; but with regard to instruction, while they have learned to read, the majority cannot be said to have gained a real taste and love for reading; they have learned certain processes in arithmetic without clearly seeing their importance and practical bearing, and have learned to write and spell without being able to indite a creditable letter, and they have a vague simmering notion of many things which the first contact with the necessities of earning a weekly wage will rub off. They go to swell the class most easily moved by the political and social agitator, by the man with an axe to grind or by the religious bigot, classes which, according to Prof. Lecky, will 'rush the country to the devil.' Of our 5,326,000, with whom I began, we are now left with only 723,000 who carry on their education in our school beyond the age of twelve, and in dealing with these I leave behind doubt, despair, and disappointment, and face a prospect full of bright hope and soul-stirring encouragement. While we deplore the fact that the remnant is so small, yet, on its behalf, the nation has made up its mind that it *shall* be saved. The last year has borne abundant evidence of this. . . . .

A Foreign Comparison.

I had intended to rigorously exclude all mention of Germany; first, because I do not believe in the superiority of its primary system to our own. German children are turned out better, not as the result either of a better system or the employment of better teachers, but because of more regular and more prolonged school attendance; and, secondly, because the conditions are so entirely dissimilar. If I only name two such conditions—the one, an honourable discharge from the secondary school means two years' freedom from military conscription; the other, the State service is largely supplied direct from the universities—it will at once be seen that the influence of such conditions must be enormous, and must be accounted for in any comparison. In the better chance given to the lad to continue his education beyond the primary school, however, the superiority of the German system must be admitted. There the lad is compelled to attend the evening school for two years—his training is technical, scientific, commercial, starts from a point at which the primary school leaves off, but continues upon lines in closer touch with the real practical life he will have to lead. He may then stop, or, if he continues, may take one of two roads. If intended for business he goes to the *Real-Schule*, where he is not encouraged to look up a ladder that will land him in the clouds, but to qualify himself for the calling which by that time he has chosen. If his aim is one of the so-called learned professions he goes to one or other of the Gymnasien. The certificate of the first-named school is valid for many posts in the public service, and is required by employers in commercial houses; the Government examinations in the latter lead to the higher civil and military posts. The educational work of our county councils is gradually bringing about something resembling the German *Real-Schule*, and is doing it to such an extent that it has been truly said that if a scheme of Secondary Education be much longer delayed it will become unnecessary. Vane said in Cromwell's time: 'The people of England have long been asleep, I doubt they will be hungry when they awake.' In this matter of technical training the hunger is upon us. More funds and better organisation is being applied. It is being discovered that to spend the money in mere lecturing either to pupils or teachers is waste, and that to shut out from the educational committees of the County Council the expert teacher is inevitably to go wrong. The prospect is full of encouragement, but for its full development the State will yet have to supply from some source or another further funds. It cannot stop where it is. I feel that in the decentralisation of our efforts for technical and scientific instruction

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we are on the right track. The system of the centralised, bureaucratic and autocratic Science and Art Department, governed by superannuated military remnants, by miners and sappers, bound hand and foot in red tape, the last home of the now discredited system of payment by results of eternal examinations—not that I imply that the results in this case were paid for—has broken down. The legacy which it has left us was expressed in the report on the iron industries on the Continent thus, 'We shall have to begin to learn again.' 'The first condition of any institution being altered is that people should come to imagine it as altered,' said Lord Palmerston. For 'altered' substitute here 'cease to be,' and then, so far as concerns our primary schools, I would ask those who are interested in the matter to exert their imagination to that extent. . . .

Had it not prevailed upon the Education Department to make drawing in primary schools compulsory, its connection with these schools would have ceased long ago. This department exists for itself. Its chief function seems to be the framing of regulations. Of all the educational reforms that will mark this year of grace there will be none more welcome to the teacher than freedom from its examinations. May I also express a hope that this reform will carry with it the abolition of the Drawing Grant, *as such*, and that there may follow it the Music Grant, *as such*, the Discipline Grant, *as such*, the Needlework Grant, *as such*, the Merit Grant, *as such?* Until these go, 'payment by results'—that 'well-meant failure'—is, in principle, still with us. We need a unification of grants. . . . .

Ladies and Gentlemen,—I have tried to answer Ruskin's three questions in so far as they may be applied to education: 'Where are we? Whither are we going? and what, under the circumstances, is it best for us to do?' In attempting this '*je fais mon métier*,' speaking as a teacher to teachers, and through them to all interested in the question who may care to listen. The end and object of all our solicitude, of all our Code making, of all our legislation, is not the salvation of any political party, is not the preservation of any particular form of religious dogma, but it is the salvation of the child. . . . . I have no fear for the future of education. Every change made, from 1870 to the two Bills of this year, is in the direction of a national system. While we rejoice that denominational schools have received increased aid we shall still further rejoice to discover that that increased aid means increased efficiency. It must, however, be recognised that the voluntary idea, in the strict sense of the term, has ceased to exist. It is a foundation all too unstable upon which to build. Furthermore, the principle of statutory equality is gone overboard, but it is so good a principle that it will return, and when it does, will do so in no questionable shape, it will come as a national—a State system. The game of going one better which is being played by the two political parties can have no other result.

Beyond this we look for the establishment of a comprehensive secondary system. While for the first I believe we need look no further than Scotland for our model, so for the right lines upon which to build the second we shall have to thank Wales. Wales has, in a short time, practically brought within reach of its entire population the advantages of secondary teaching, and has also taken steps—notably in its recent provision for the training of its pupil teachers in intermediate schools—to link it with the primary system.

All this is as it should be, and we wish it 'God-speed.' We recognise that in this matter of education the heart of this nation is sound. The measure of popular control which we already possess has created public interest and an intelligent public spirit whose workings nothing can stop; we see Milton's 'noble and pursuant nation raising itself, like a strong man after sleep.' I have only to add that, in every forward movement that makes for educational righteousness, in every advance that shall cause this country of ours 'to rejoice in times to come,' there is no more loyal, no more enthusiastic, no more self-sacrificing body of men and women than the primary teachers of England.

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NOTES AND NOTIONS.

BY T. B. ELLERY, F.R.G.S.

Ex-President of the National Union of Teachers.

At Swansea. The representatives must have come to the conclusion immediately they reached Swansea on Saturday morning last (by the way, some came two days earlier), that they were in for 'a bad time.' Pouring rain can never give an air of welcome, especially after the visitors have spent several hours in a railway carriage with little to do beyond watching and hearing the pitter-patter of the rain upon the windows. I am afraid it must be confessed that, by comparison with Brighton, Swansea has not been the success that we all hoped it might be. Yet, no one is to blame, for the local committee has worked with extraordinary zeal, and, under all the circumstances, has accomplished wonders.

The only thing that can be said is Swansea is *not* Brighton! Having said that, I desire, and I am sure every representative will desire, to give to the Swansea teachers and public the heartiest thanks for the kindness and courtesy extended to one and all alike.

In many respects the Conference has been successful, and many of one's recollections will be of an interesting character.

Who is likely to forget, for example, the magnificent scene on Monday in the Albert Hall during the reception by representatives of the local bodies and during the singing of 'God save the Queen' by the great audience, and of the first verse of 'Hen Wlad fy Nhadau' (Land of my Fathers) by the Prince *in* Wales—Mr. Tom John? Who is likely to forget, too, the other pleasant functions of the week, the College Reunions, the reception of representatives by the president and officers of the Liberal Club, the reception by the Mayor and Mayoress, and the ball? And above all, who is ever likely to forget the Purse Day at the Albert Hall?

Some of these matters must be left over to be dealt with on another occasion, as these notes are being written during the pressure of the Conference week.

The Reception of Deputations by Conference. The deputations from Scotland, Ireland, and Belgium all put in an appearance during Monday afternoon and received an enthusiastic welcome. From the Educational Institute of Scotland we had Mr. John Adams, M.A. (President), known by his writings at least to all readers of the PRACTICAL TEACHER, and Mr. Hugh McCallum, M.A., who was sent specially to represent the Class Teachers north of the Tweed; from the Irish National Teachers' Organisation Mr. J. J. Matthews and Mr. M. Hanly, B.A., both of Dublin, and from the Fédération Générale des Instituteurs belges, Mons. Blondiau, of Liège. I think all these gentlemen will long remember the Swansea Conference, and the many friends they made during the week. Having myself represented the N.U.T. both in Scotland and Belgium it was an especial pleasure to me to meet these gentlemen and to spend as much time as possible in their company. I have lively recollections of the hospitality of our Scotch and Belgian friends, hospitality which we endeavoured to return on this occasion. I cannot, of course, give all the speeches made by the deputations on Easter Monday, though all were interesting. I must content myself with very few words and those having reference to M. Blondiau. This gentleman made troops of friends during his stay, and although his English is not sufficiently advanced to enable him to feel quite at home

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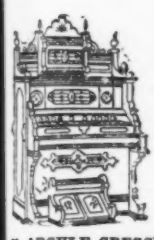

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in the language, he, nevertheless, shows he is making excellent progress, and by the next time we meet him it is certain that an interpreter's service will be little needed.

He spoke in his own tongue at the Reception, and I have pleasure in giving his speech as delivered :—

> Frères, Sœurs,—Au nom de la fédération générale des instituteurs belges, je vous adresse à tous, le salut fraternel, et vous apporte les vœux les plus ardents pour le triomphe de la cause que vous défendez si vaillamment depuis 26 ans.
>
> Si vous n'avez pas, comme en Belgique, ni loi sur les pensions, ni un système logique d'inspection scolaire, ni hiérarchie (classification), ni 'scale of salary' ; si les instituteurs (teachers) ruraux ne jouissent pas d'une situation convenable vous possédez des biens inappréciables : la liberté de penser, de parler, d'agir selon vos principes philosophiques, politiques et religieux—un peuple qui apprécie votre mission et les bienfaits de l'instruction ; des autorités qui vous estiment ; des hommes intelligents, capables, dévoués qui vous entourent et vous soutiennent ; enfin les représentants de la 'Presse,' amis fidèles qui vous defendent et vous protègent.
>
> Vous êtes donc plus heureux que nous, car on ne vit pas seulement avec le pain du corps, mais encore et surtout avec le pain de l'esprit.
>
> Si vous n'avez pas reçu satisfaction jusqu'à présent, pas plus d'ailleurs que les éducateurs des autres pays, c'est qu'il manque, dans votre lutte, une entente internationale : 'l'union entre les individus constitue la force' (Union is strength), mais *l'union internationale* constitue 'la plus grande force.' Le développement et la puissance du socialism en est une preuve convainquante. Sans un mouvement général européen, sans une action commune de tous les éducateurs de la jeunesse, jamais nous n'occuperons dans l'organisme social la place qui nous est due. Il ne faut pas oublier que l'éducation et l'instruction ne sont pas seulement des œuvres nationales, mais aussi des œuvres sociales.
>
> Il est donc nécessaire d'organiser un conférence imposante, où les éducateurs de toutes les contrées européennes seraient répresentés, afin d'arrêter les bases des aspirations du corps enseignant. On oublie trop souvent que les éléments de securité et de prospérité d'une nation comprend : la magistrature, l'armée, l'enseignement ; que les deux premiers jouissent d'un prestige sans bornes et d'une position matérielle privilégiée ; tandis que le 3me est meconnu ou incomplément apprécié.
>
> Or par sa puissante organisation, le fédération générale des instituteurs anglais (the National Union of Teachers) donne un exemple admirable de l'union la plus virile, de la fraternité la plus solide. Elle est donc le mieux en situation de jouer un rôle prépondérant dans la future enterprise, et conduire à bonne fin l'œuvre de concentration de laquelle dépend la réalisation des revendications des éducateurs européens. Nous avons parlé, discuté, imploré suffisamment ; le moment est venu d'agir, de battre le fer tant qu'il devienne chaud. 'Chacun pour tous, tous pour chacun,' telle doit être la devise des 'maitres de la jeunesse.'

The President and the President's Address. Limited as I am by considerations of space, it is impossible for me to refer, as I should like to refer, in detail to the President's Address.

We all expected a sound, scholarly production, and we were not disappointed. As Mr. Tom John said at the Conference, the key-note was *the child first, the child second, and the child third*. Members of the Union owe Mr. Addiscott a deep debt of gratitude for the splendid work he has done in his capacity of Chairman of the Law Committee, and if I am not much mistaken, the debt will be even greater before his term of office expires.

In the name of the great army of the teachers of the country, as well as in the name of the readers of this Journal, I congratulate the President on his manly address, and trust he may have a most successful year at Russell Square. To rule over Conference is, perhaps, a difficult matter ; to preside over the deliberations of the Executive is an infinitely more difficult task, and the year's experience is, as a rule, sufficient for any man, and that not because the members are wanting in consideration, but because the hours are long, the work trying and often delicate, and the responsibility of the position greater than the majority of the members of the Union can possibly imagine.

A Very 'Progressive' Conference. The Executive, at one of its meetings this year, passed a resolution to send the sum of £50 to the Penrhyn quarrymen in appreciation of their struggle to defend the right of combination. At the next meeting this resolution was rescinded, chiefly on the ground that the rules of the Union gave no authority for making such a grant. Everybody knew the matter would not be allowed to rest there, and it was generally understood that Mr. Alderman Thompson, of the Chelsea and West London Association, would take the sense of Conference upon the vote. Mr. Thompson, indeed, was not satisfied with £50 ; his minimum was £150, and that Conference was with him is proved by the fact that the majority in his favour was over 11,000. He was careful to explain that he was not seeking to introduce the thin end of the Trades Union wedge, his one anxiety being to defend the right of combination. I have no hesitation in saying that such a result would have been impossible a few years ago. Conference evidently is now a 'progressive' body. Take the question of Electoral Districts. After the overwhelming defeat of the advocates of Electoral Districts a few years ago, no one could possibly imagine that Conference by an almost unanimous vote, certainly by an overwhelming majority, would now declare for the change, and what is more, demand that the next election should take place under that system. Truly a most 'progressive' Conference.

The Ladies' 'At Home.' The Ladies' 'At Home' at the Swansea Training College was one of the features of Conference. Between two and three hundred were present, the proceedings throughout being of the most interesting character.

Miss Herd, introduced by Principal Salmon, welcomed in kindly manner the visitors, and spoke to them on the many questions affecting principally women teachers, especially those leaving Training Colleges. She touched upon the question of the teaching of drawing being dependent upon the teaching of cookery, upon the inequality of the salaries of Infants' and Girls' mistresses, the inequality of the salaries of Women Assistants in Boys' Schools, claiming that if they did equally good and productive work, they should receive equal payment with the men.

Mrs. Burgwin, in her usual happy manner, spoke of what should be the aims and ideals of the woman teacher, urging those whose appointments took them into rural schools not to allow themselves to drop their interest in questions outside their profession, and strongly advising them to keep up their studies.

Miss Cleghorn, L.L.A., spoke on the subject of needlework, urging teachers to exercise their freedom to arrange their own schemes for the teaching of that subject, and advising the omission of garment-making on the lines of Schedule 3, advocating the more educational line of teaching adopted by the Alternative Scheme at present being worked in many different towns of the country. Miss Selvage next voiced the wants and needs of the rural teachers, for whom she is so well qualified to speak, touching upon the questions of staff, low salaries, etc. A most enjoyable entertainment followed, consisting of a farce, tableaux, and other items. Light refreshments were served during the evening.

Altogether the function was a most delightful one, and those responsible for the arrangements are to be heartily congratulated upon the complete success attending their efforts.

Lieutenant H. S. Goodyear. One of the best-known teachers in Yorkshire is Henry S. Goodyear, head-master of Westgate Board School, Wakefield, 1874–97, and now appointed to the new school which is to replace Westgate and which is ultimately to provide accommodation for a thousand children.

He has recently made an appearance in the police-court at the invitation of an irate parent, but the Law Clerk of the Union, Mr. Organ, had little difficulty in convincing the Bench that Mr. Goodyear had but done his duty.

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an unruly child. However, there is the satisfaction that the charge was dismissed, and that Mr. Goodyear left the Court 'without a stain upon his character.' The subject of this note has filled the office of President of the Wakefield Association three times, and President of the West Yorks District Union twice. For ten years he was Secretary of the Wakefield Mechanics Institution ; for two years he was treasurer, and he is now Vice-President ; for six years he has been a mem-

LIEUTENANT HENRY S. GOODYEAR.

ber of the Wakefield Technical and Art School, for eight years vice-president of the cycling club. He has passed through all the grades of the volunteer force from private to quartermaster-sergeant ; he holds the long-service medal for twenty years' service, and he is now lieutenant. He may, I believe, be looked upon as the premier 'shot' in Yorkshire ; he has been selected four times for the English Twenty or Reserve at Wimbledon, and in 1887 he fired in the winning International Team. He has won the N.R.A. Bronze County Medal, together with badges for the Queen's and St. George's, and the bronze medal for 'Grand Aggregate.' In the masonic world he is also well known ; he is a member of Lodge and Chapter 495, P.M. and P.Z., Past Provincial Grand Swordbearer (Arch), and he is at present Provincial Grand Assistant Secretary (Craft).

I have said little as to his career as a teacher. That is unnecessary probably, for it is so well known. Readers of the PRACTICAL TEACHER will congratulate Lieutenant Goodyear on the result of the 'assault' case, and they will join me, I am confident, in wishing him many years of health, prosperity, and happiness.

Unfortunately, owing to the recent illness of Mrs. Goodyear, he was unable to attend the Swansea Conference. By this time, I trust, all is well again at Westgate. My hearty congratulations and best wishes, Lieutenant Goodyear.

One of the Old Guard has been very properly honoured at Macclesfield during the past month. Mr. George Peachey, who has occupied the position of Head-Master of the National Schools for half a century, was presented with a purse of fifty guineas and an illuminated address at a public meeting at the Town Hall presided over by the Mayor, and attended by many of the local dignitaries. An excellent portrait of Mr. Peachey was also presented to the Managers, to be by them hung in the schoolroom where he has so long and so efficiently laboured. We wish him an extended term of honourable leisure to be rendered comfortable by a pension from a grateful nation.

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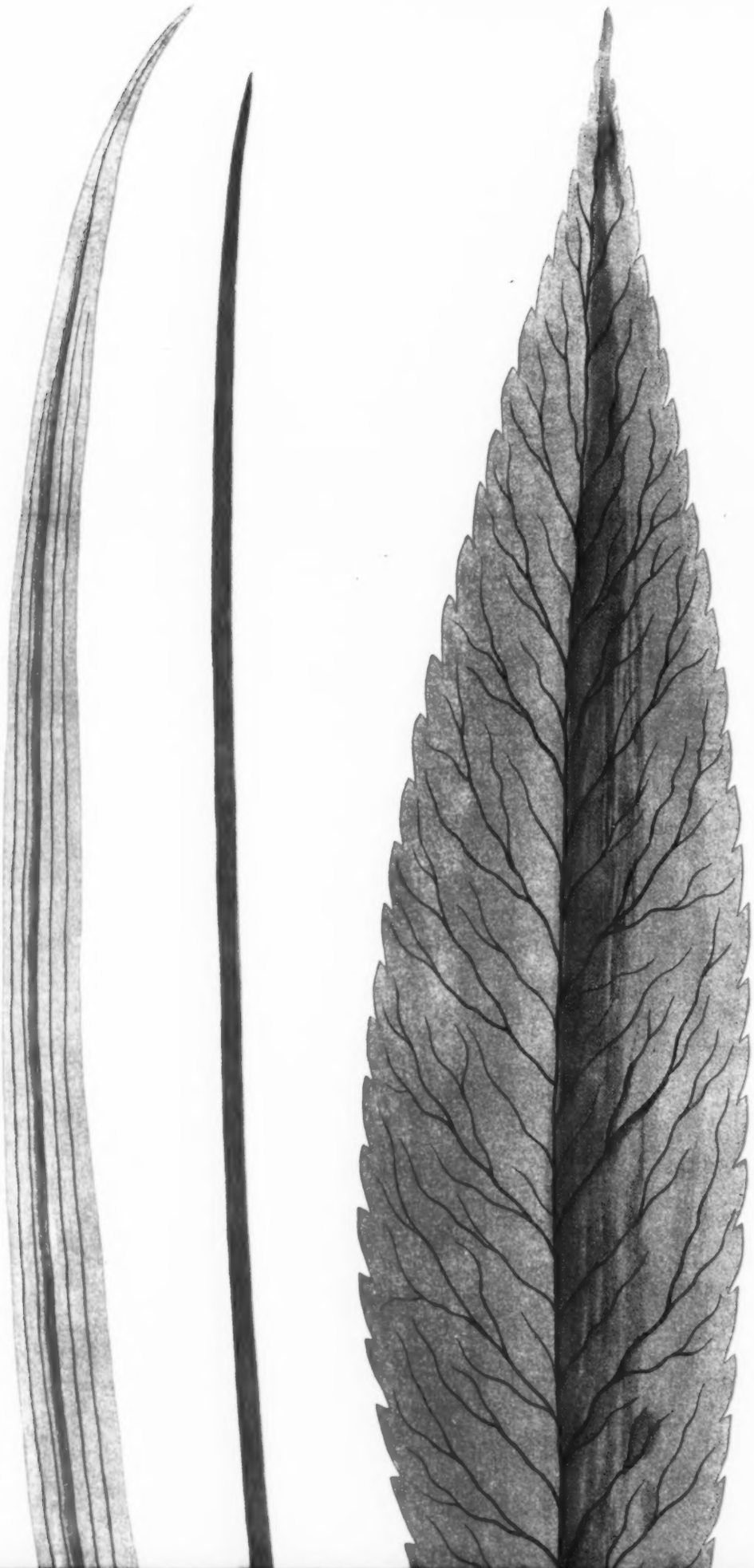

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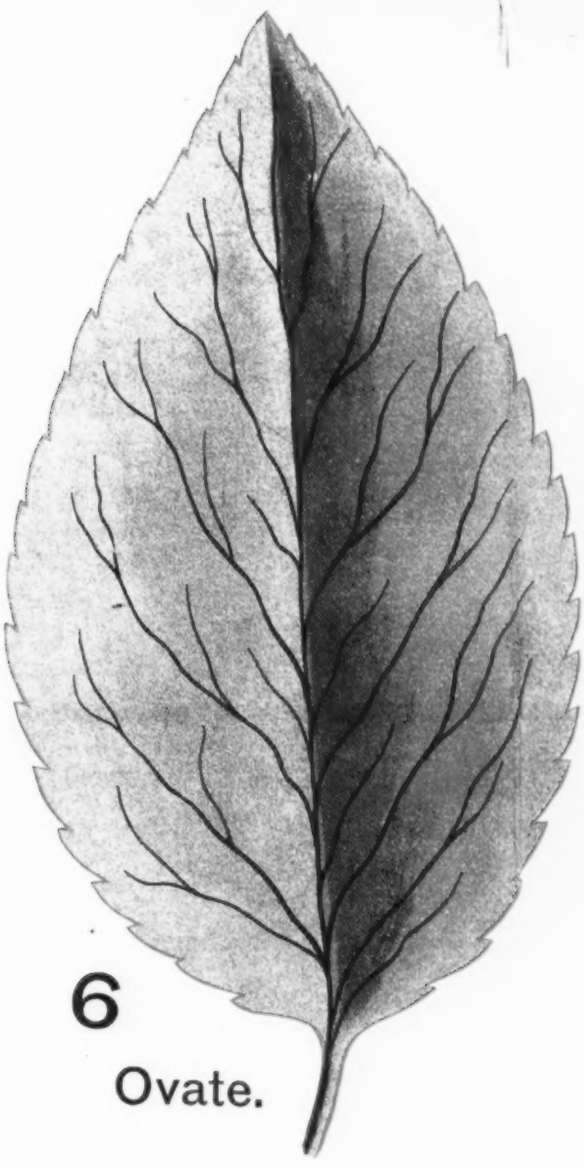

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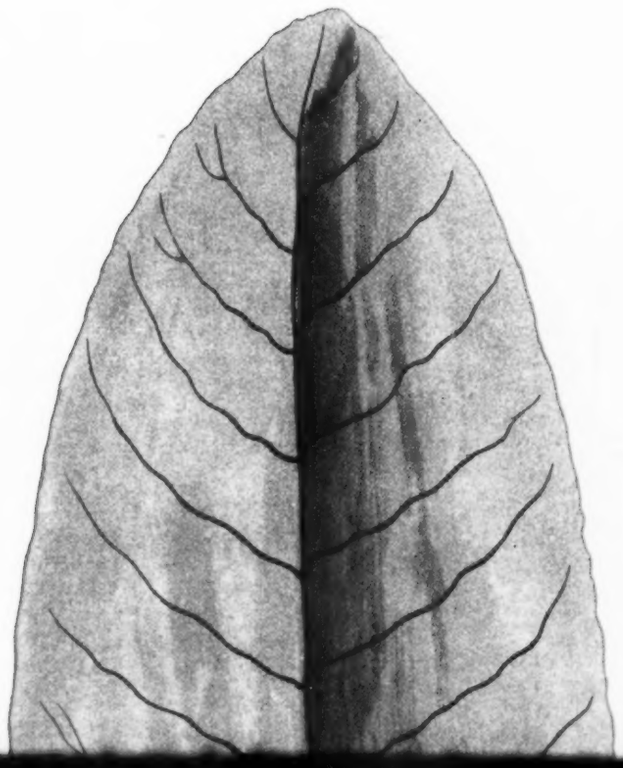

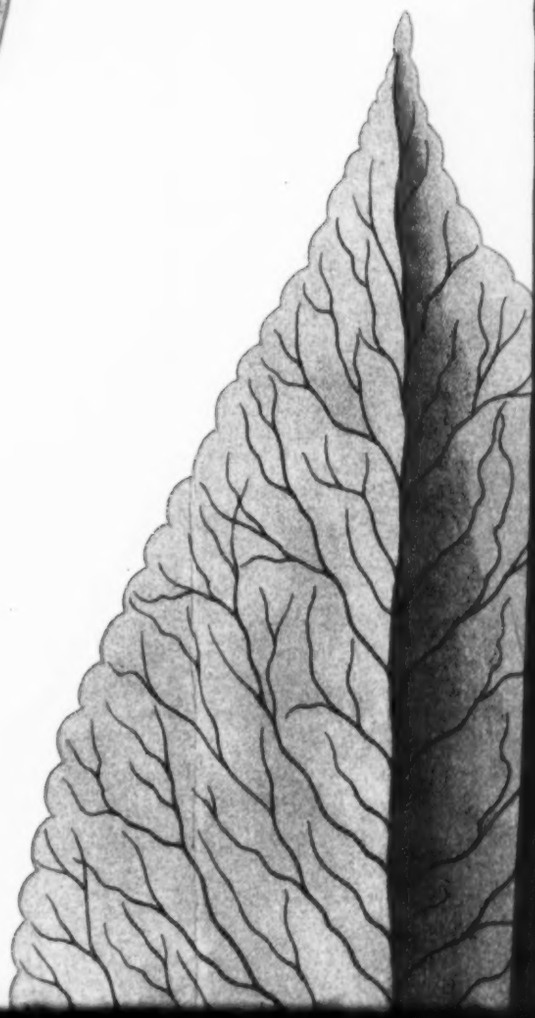

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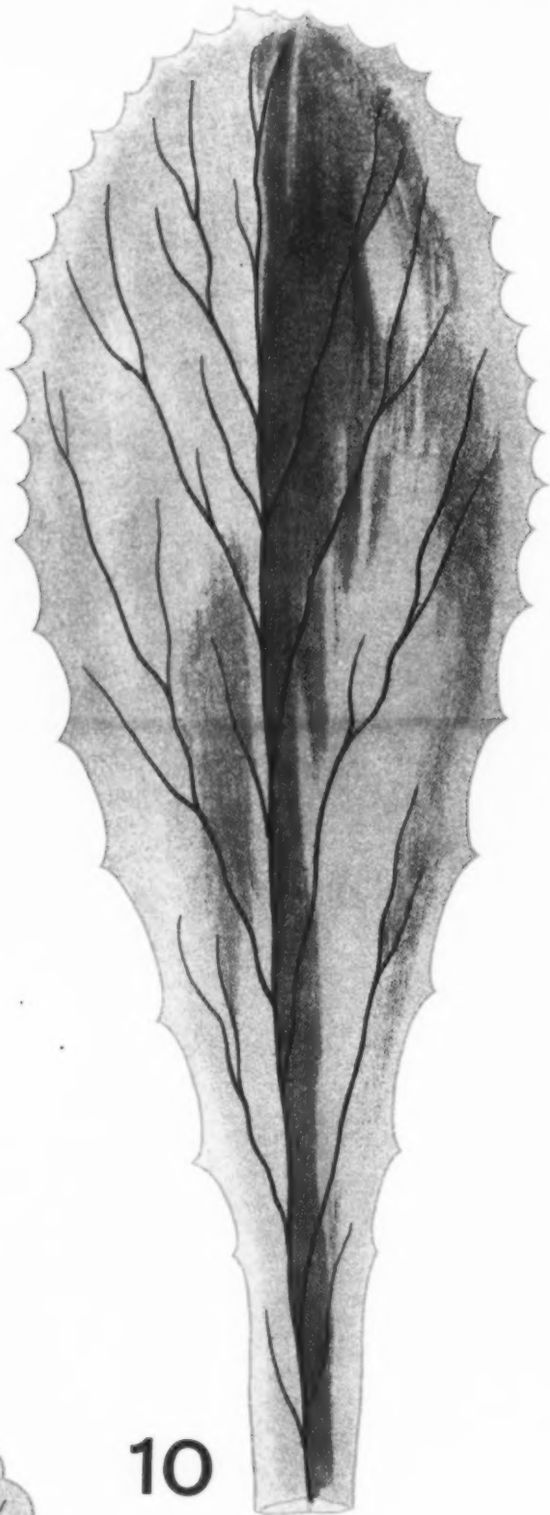

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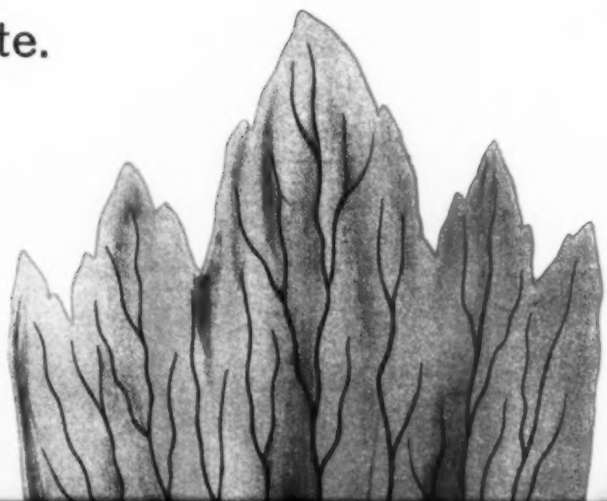

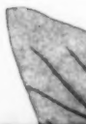

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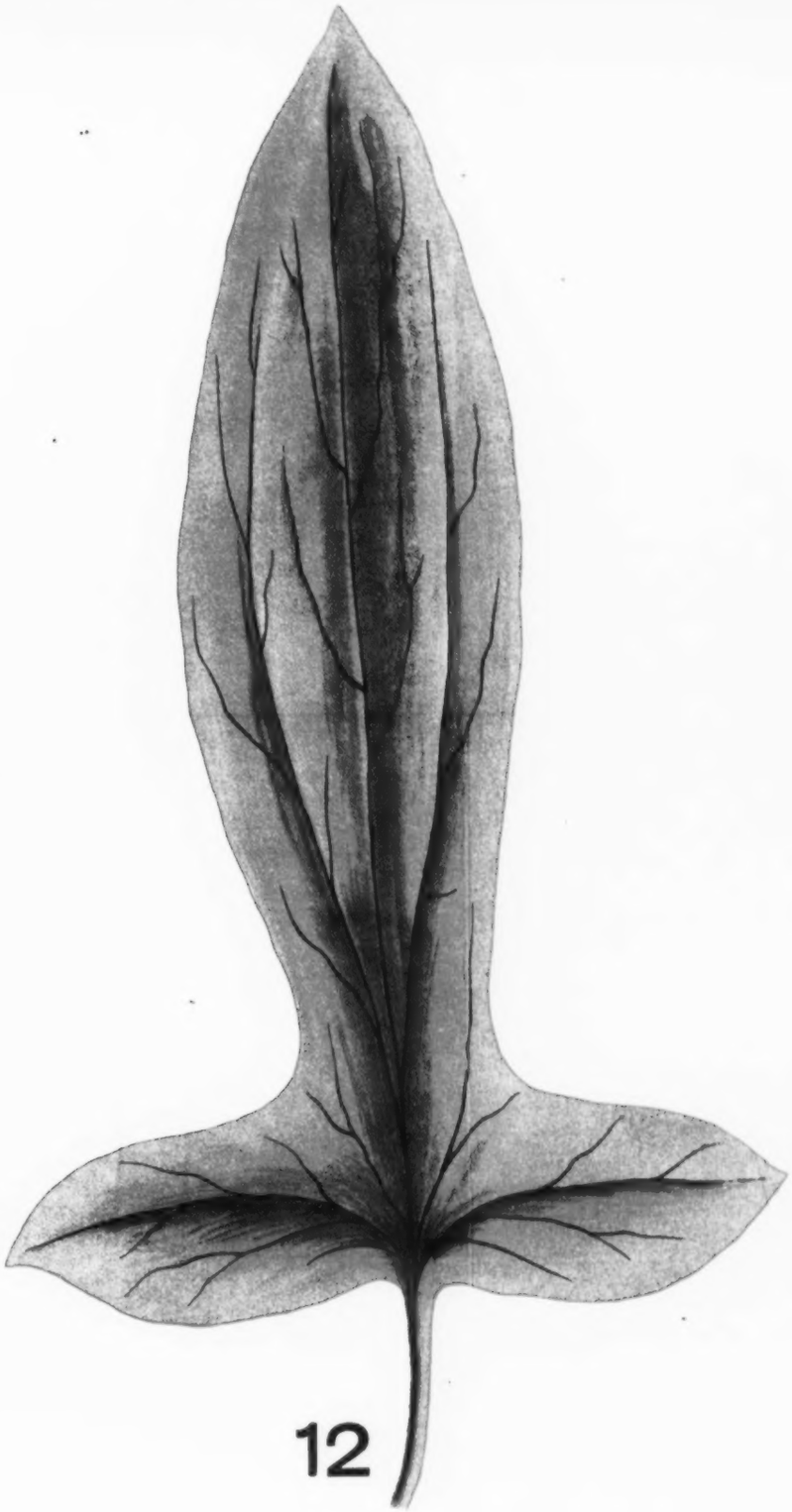

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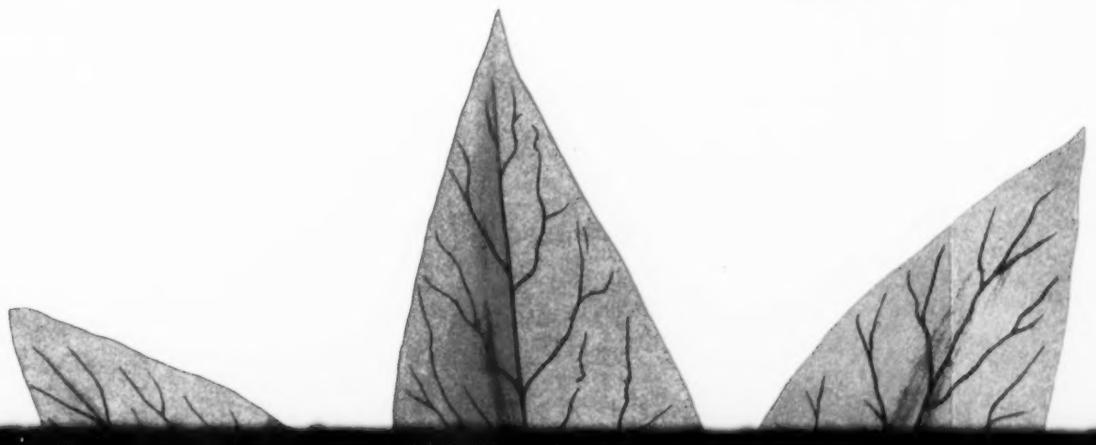

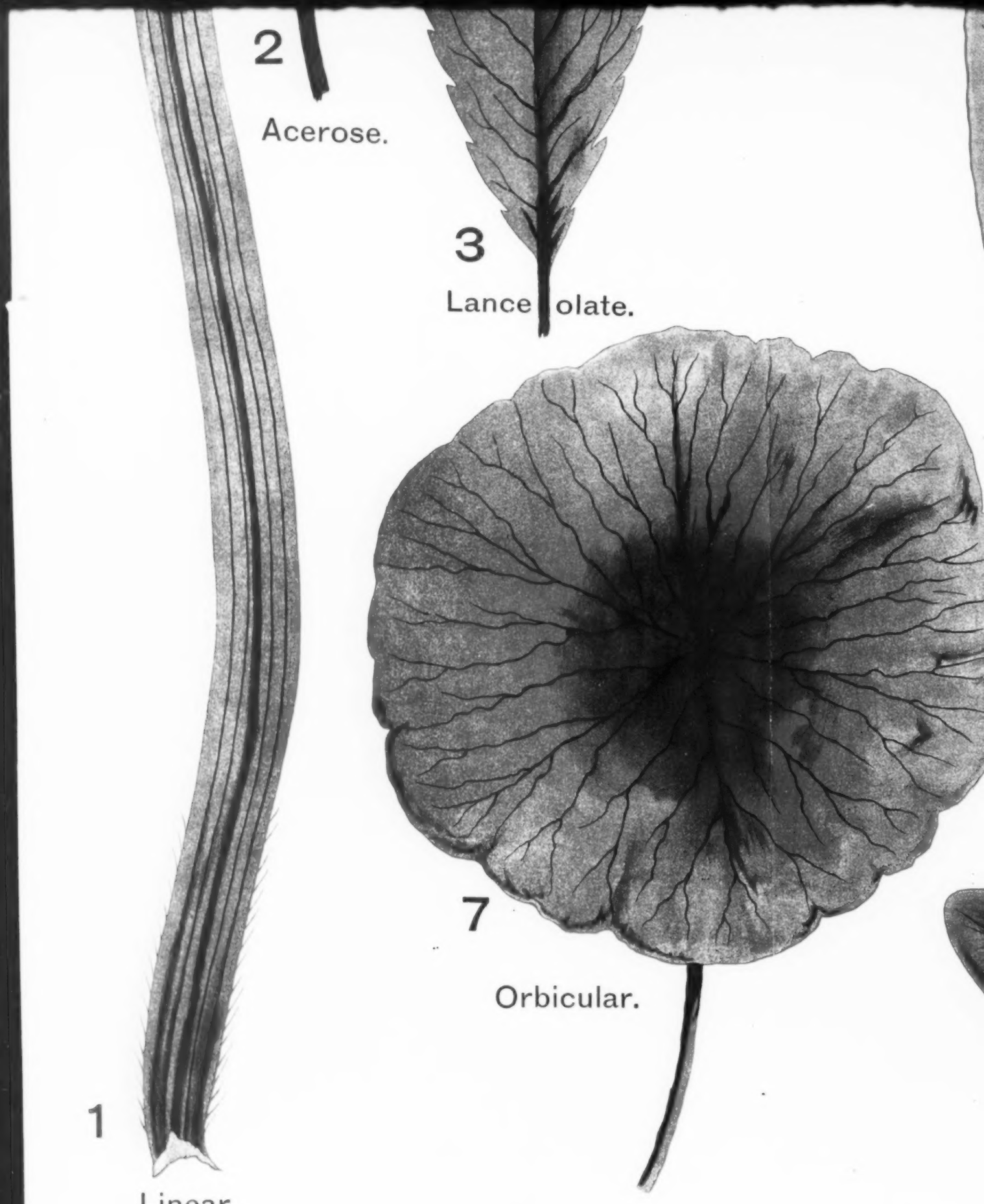

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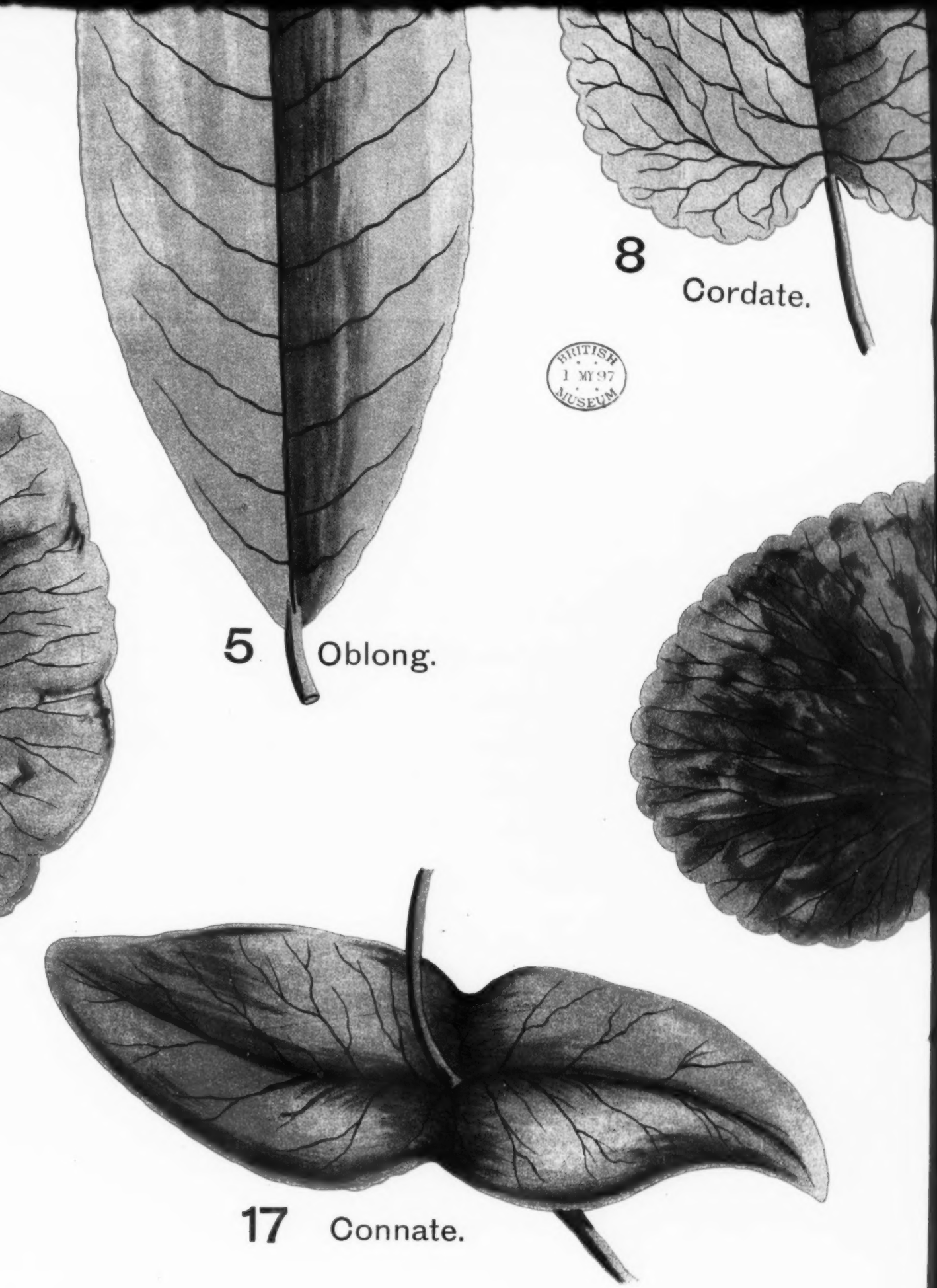

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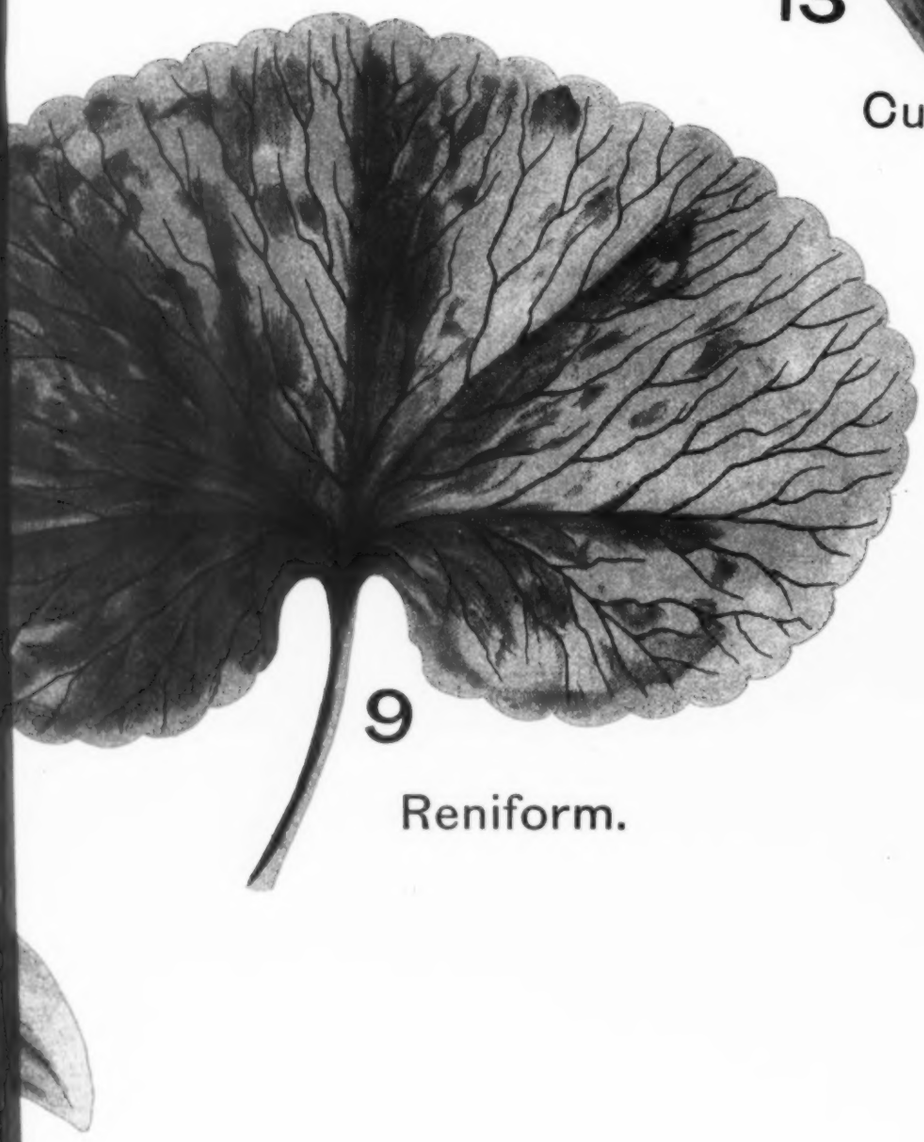

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